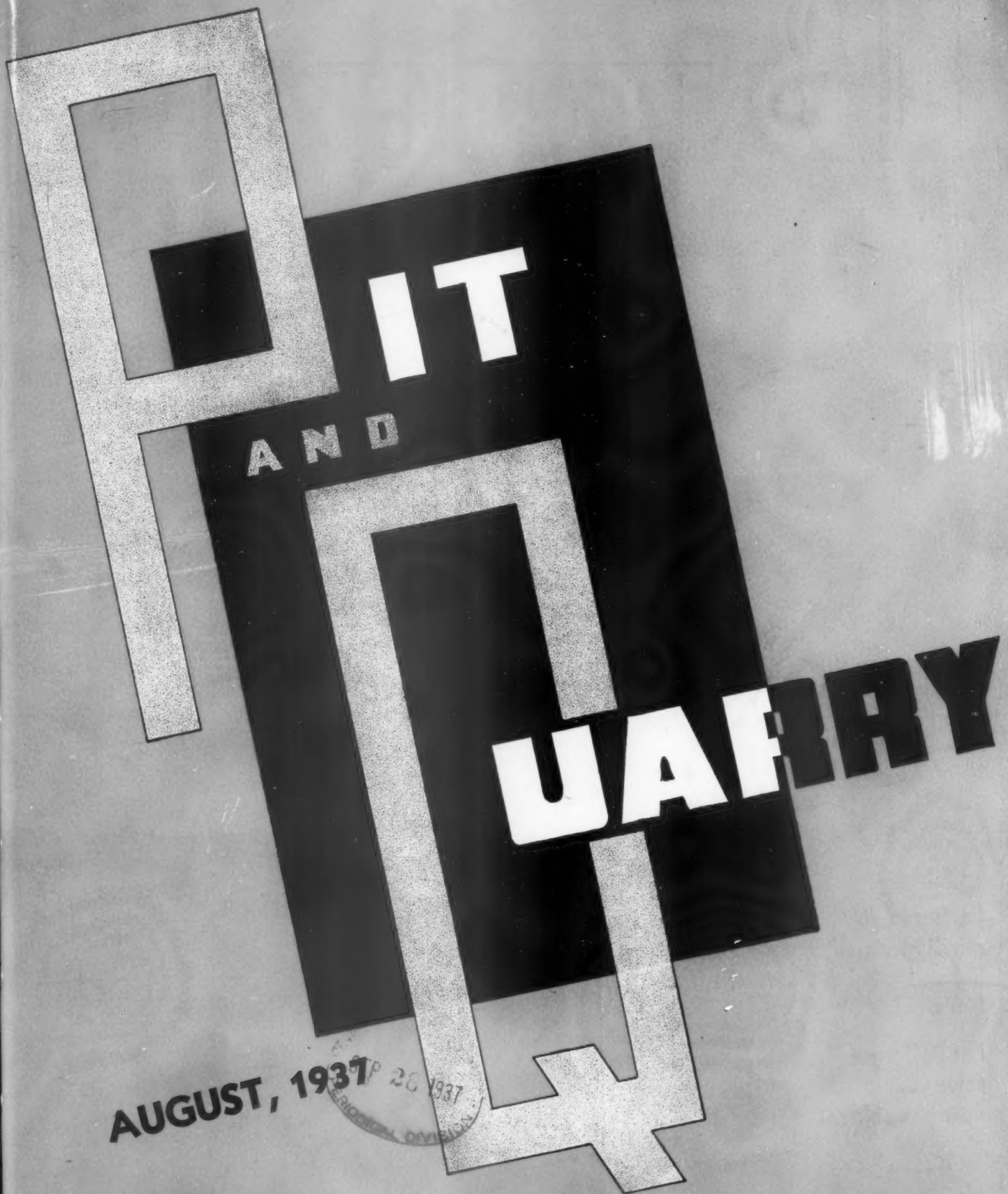


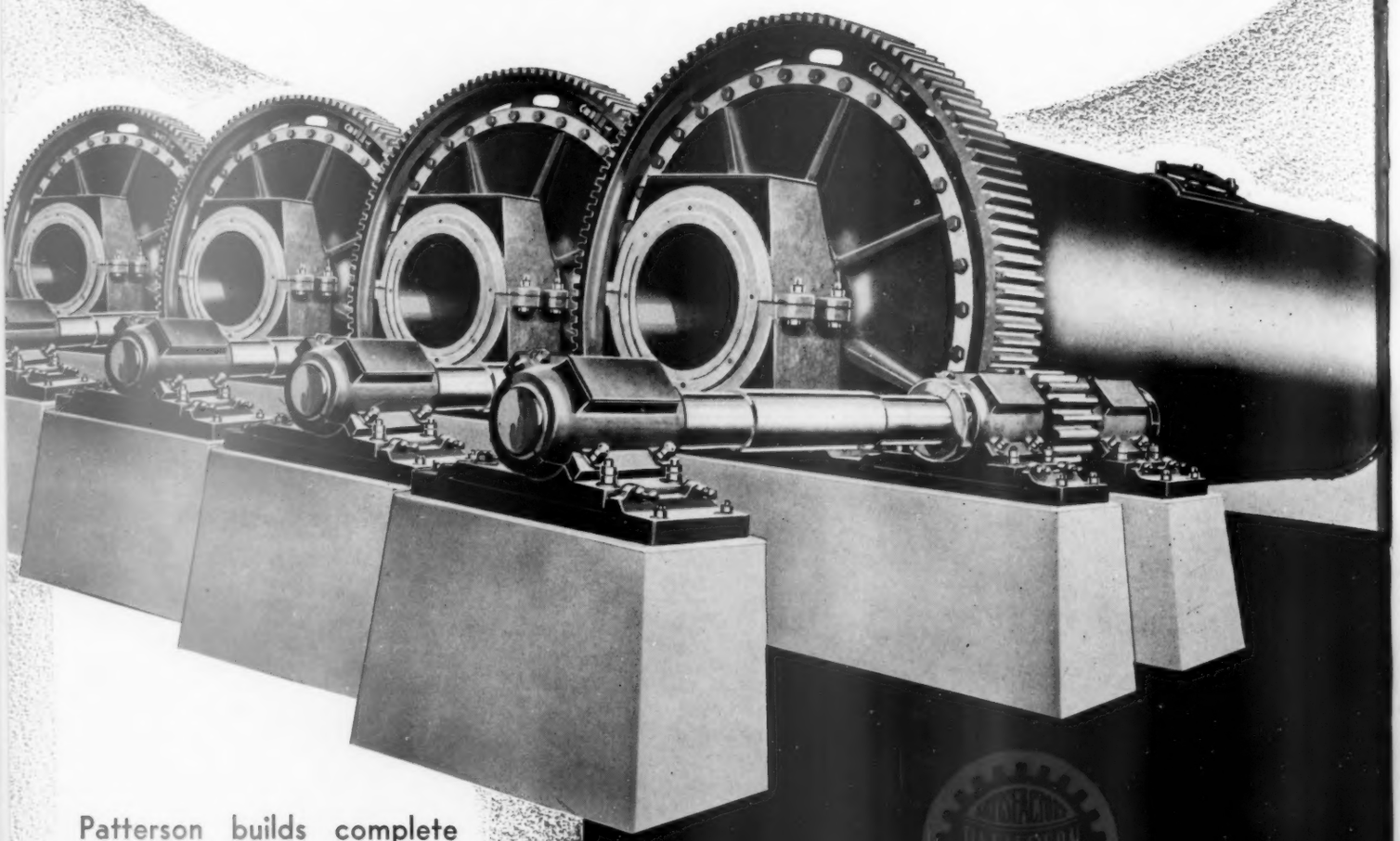
SEP 28 1937
ENTOMOLOGICAL DIVISION

AUGUST, 1937

Another New Rotary-Kiln Lime Plant . . . More Views on the Labor Problem
TVA-Guntersville Dam Project . . . Gravel Operator Makes Products Pay

PATTERSON

BALL *and* TUBE MILLS



Patterson builds complete grinding, classifying, processing and refining plants of all kinds.

Let Patterson Engineers help solve your grinding and processing problems.

Richard L. Cawood
President

For quantity production at low cost.
Built in all types and sizes.
Tube Mills for fine grinding.
Ball Mills for coarse grinding and granulating.
Send for catalog.

THE PATTERSON FOUNDRY & MACHINE CO.
EAST LIVERPOOL, OHIO, U.S.A.

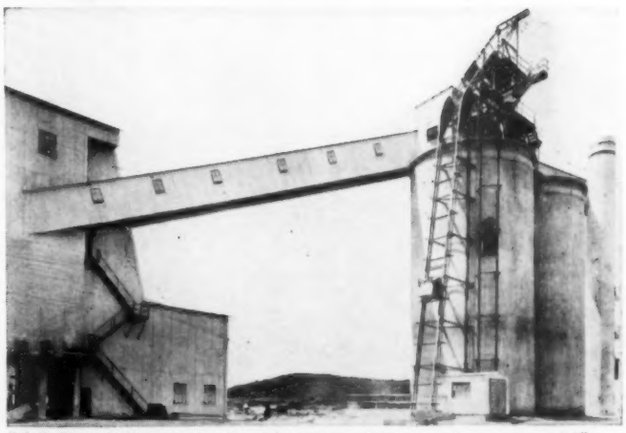
H. E. MILLARD COMPANY'S ULTRA-MODERN LIME PLANT, Annville, Pa.

Link-Belt Equipped!

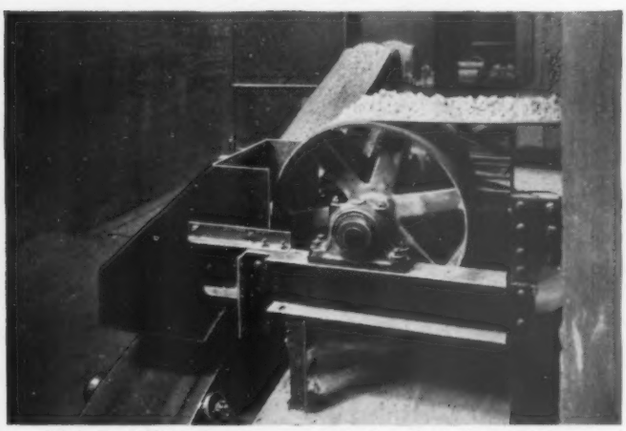
● Link-Belt bucket elevators, belt conveyors, two automatic skip hoists and a vibrating screen assure low-cost, efficient handling services throughout this modern plant. (F. L. Smidth & Co., Engineers, New York).

Link-Belt makes everything for the handling, classifying and washing of sand, gravel, stone, lime, cement, etc. It is built to last and work efficiently under the grueling conditions which usually prevail in plants producing these materials.

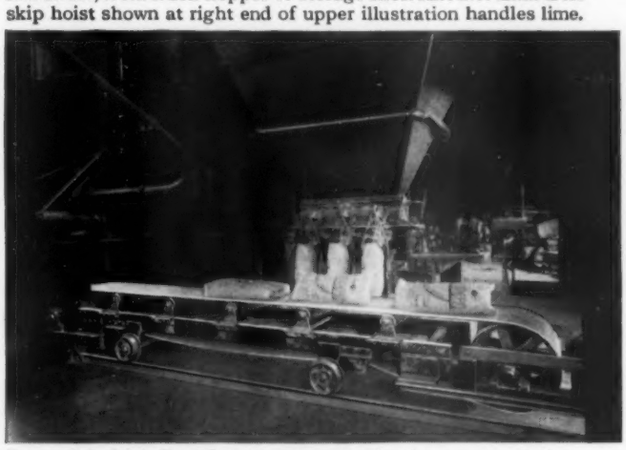
Send for catalog. Link-Belt Company, Chicago, Philadelphia, Atlanta, Indianapolis, San Francisco, Toronto, and offices in principal cities.



Link-Belt fully automatic skip hoist which handles stone 2-½" and under, from truck hopper to storage silos. Another Link-Belt skip hoist shown at right end of upper illustration handles lime.



Link-Belt Belt Conveyors reclaiming lime from storage and delivering to bucket elevator.



Reversible Link-Belt Belt Conveyor for loading packaged lime into cars or trucks.

LINK-BELT

7117

Equipment for Handling Sand, Gravel, Stone

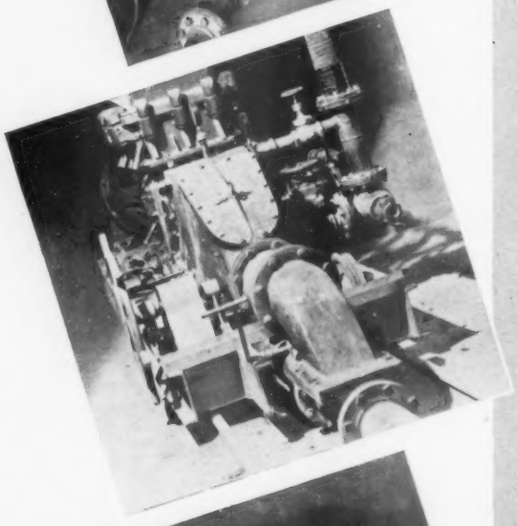
PIT ND QUARRY, August, 1937. Vol. 30, No. 2. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada and Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter November 28, 1932, at the Post-Office at Chicago, Ill., under the Act of March 3, 1897. Additional entry at Milwaukee, Wis.

There's a FULLER-KINYON PUMP for every application

Fuller-Kinyon Systems are available in many types and for transporting varied dry pulverized materials. They offer to manufacturers and users of such materials many novel functions and methods in addition to direct economies obtainable.

Stationary Fuller-Kinyon Pump: A full range of capacities to convey from any source of supply from which material can descend by gravity to the hopper of the pump. For example, conveying from grinding mill discharge spouts or collecting screws serving a plurality of mills; to storage silos or bins; from storage silos to packer bins; and directly to cars, barges, and ships for bulk loading, and recirculation for mixing and blending of materials.

Portable Fuller-Kinyon Pump: Has many uses and is commonly employed for withdrawing cement from silos to expedite shipment of standard, tested, and special cements, either in bags or bulk. The pump, traveling on tracks, may be moved from one point of discharge to another and placed in operation in a few minutes, thereby avoiding any delays in packing different cements. It offers unusual advantages in speed in transferring cement from silos or from several in a group to one or more packer bins.



Fuller-Kinyon Automatic Remote-Control Unloader: Used for unloading and conveying Portland cement and other pulverized materials, and differs considerably from those previously manufactured by the Company. It offers a wider field of utility and greater handling capacity. SAFETY—Safe for use in cement mill stockhouses. Remote control keeps the operator out of the bin...out of danger from slides... out of the dust.

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CEMENT
CEMENT RAW MATERIALS
CHALK
CLAYS
COKE DUST
FELDSPAR
FLINT
FLUE DUSTS
FULLERS EARTH
GLUTEN FEED
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KAOLIN
LIME
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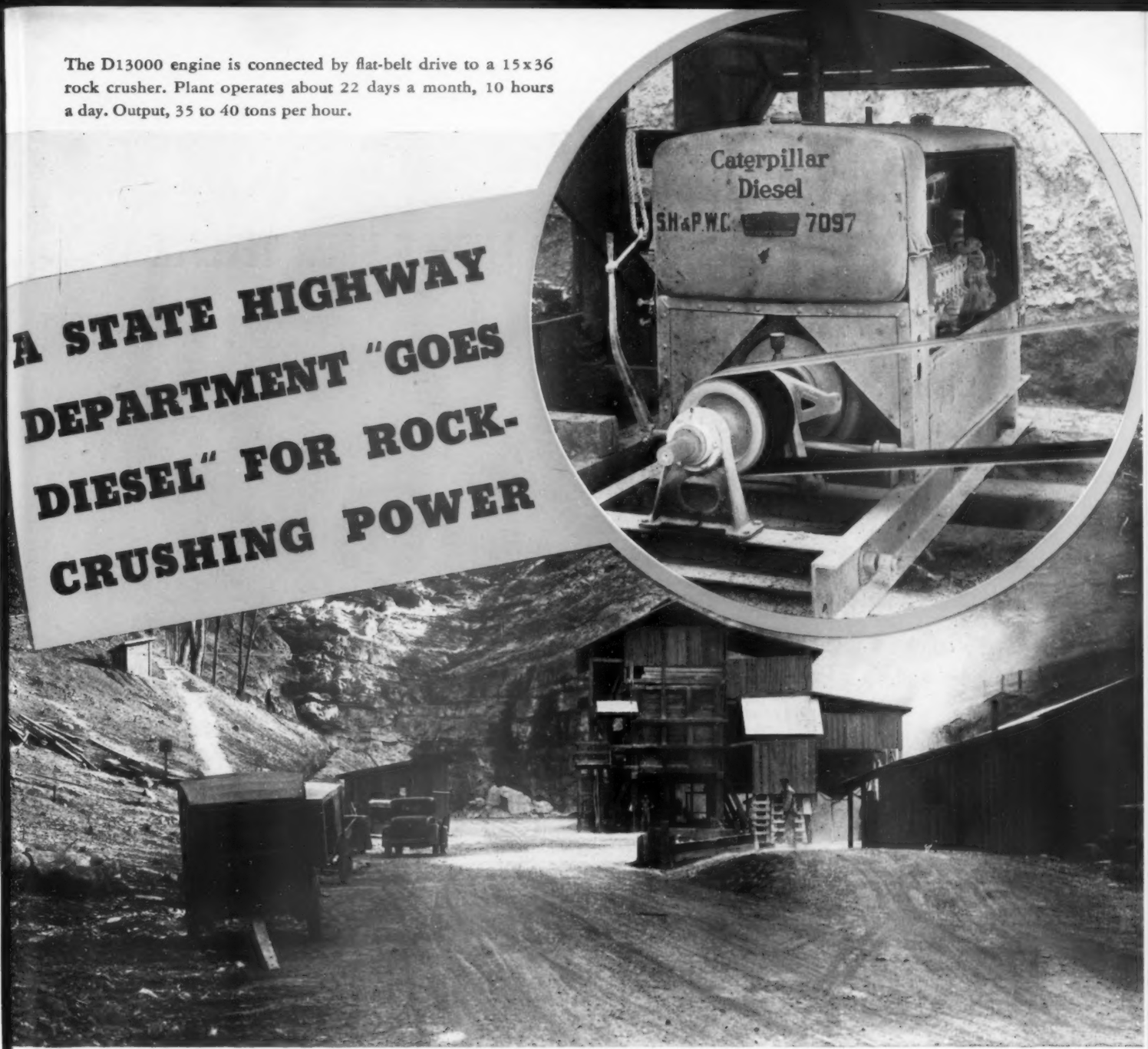
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

FULLER COMPANY
CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg. San Francisco: 320 Chancery Bldg.

P-24

The D13000 engine is connected by flat-belt drive to a 15x36 rock crusher. Plant operates about 22 days a month, 10 hours a day. Output, 35 to 40 tons per hour.



A STATE HIGHWAY DEPARTMENT "GOES DIESEL" FOR ROCK-CRUSHING POWER

WIDE EXPERIENCE with "Caterpillar" Diesel track-type Tractors and road machinery has acquainted highway departments with the dependability and the unusual economy of Diesel engines, as perfected by "Caterpillar." Hence, to make highway dollars go still farther, it is logical that the State Highway Commission of North Carolina should have adopted the same low-cost type of power to operate its rock-crushing plant (pictured above) at Marion, N.C.

Power is supplied by a 125-hp. engine at the astonishingly low fuel-and-lubrication cost of 40½c an hour—or a trifle more than *1c a ton.*

What can be done under "official" supervision can also be done by private crushing-plant owners. For further facts and details, get in touch with a nearby "Caterpillar" dealer—or write us direct. *Seven engine sizes—44 to 160 hp.*

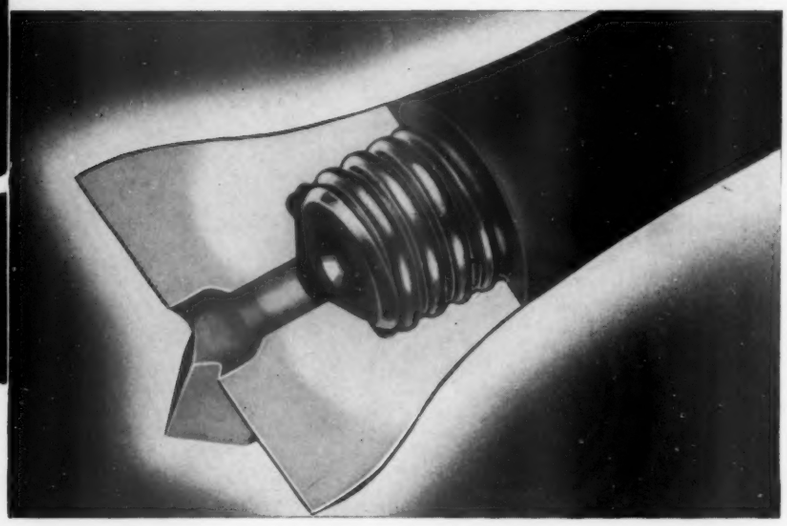
CATERPILLAR DIESEL ENGINES

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS . . . WORLD'S LARGEST MANUFACTURER OF DIESEL ENGINES

THERE IS A TIMKEN AUTHORIZED CONVERSION SHOP

AT THE OTHER END OF YOUR TELEPHONE . . .



HIAWATHA, Timken Bearing Equipped streamlined flyer of the Milwaukee Road

Timken Authorized Conversion Shops fully equipped with the special machines, dies and tools necessary for converting steel, quickly and economically are now in operation throughout the country in conjunction with Timken Rock Bit Distributors.

These shops are manned by trained and experienced operators working under supervision of Timken conversion engineers. They are equipped to handle all sizes of round and hexagon steel and put dependable conversion service within easy reach of every user of TIMKEN Rock Bits.

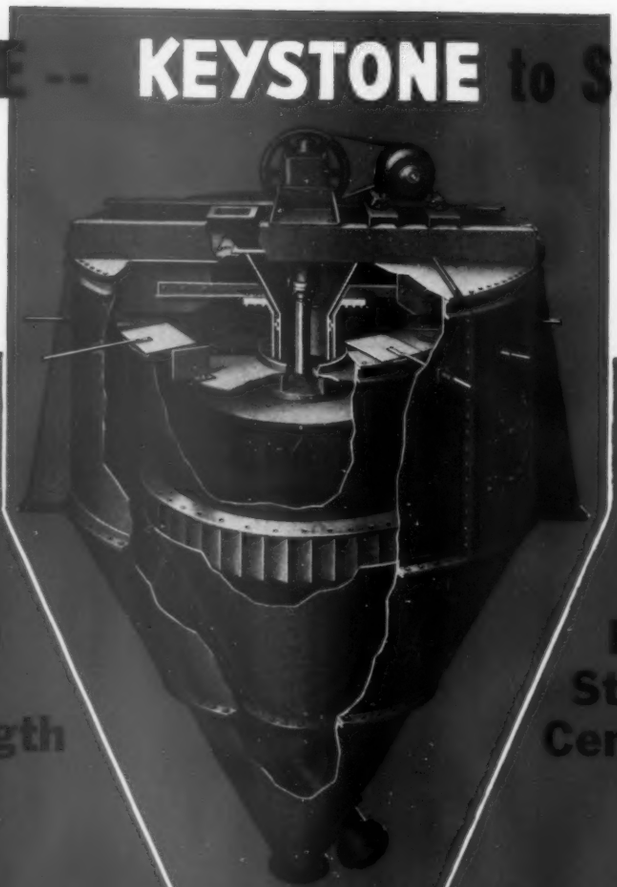
Write for the name of the Timken Rock Bit Distributor and Authorized Conversion Shop nearest you.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
ROCK BITS

EXPERIENCE -- KEYSTONE to SEPARATION



STURTEVANT

AIR SEPARATORS

Knowing what to do—and how to do it—comes from years of experience in applying Sturtevant Air Separators to the production problems of industry.

In the cement field alone, Sturtevants are doing a great job—enabling producers to meet the super-specifications of today with ease and economy.

To make High Early Strength at lower cost, plant operators are installing Sturtevant Separators. Such requirements as particle size control, specific surface area, lower temperature—are all in a day's work for a Sturtevant.

Increased tonnages are assured, whether 60 mesh or micron sizes —and quality cements regardless of the type of grinding mill.

Write for full details

STURTEVANT MILL CO., DORCHESTER, BOSTON, MASS.

Specific Surface Area

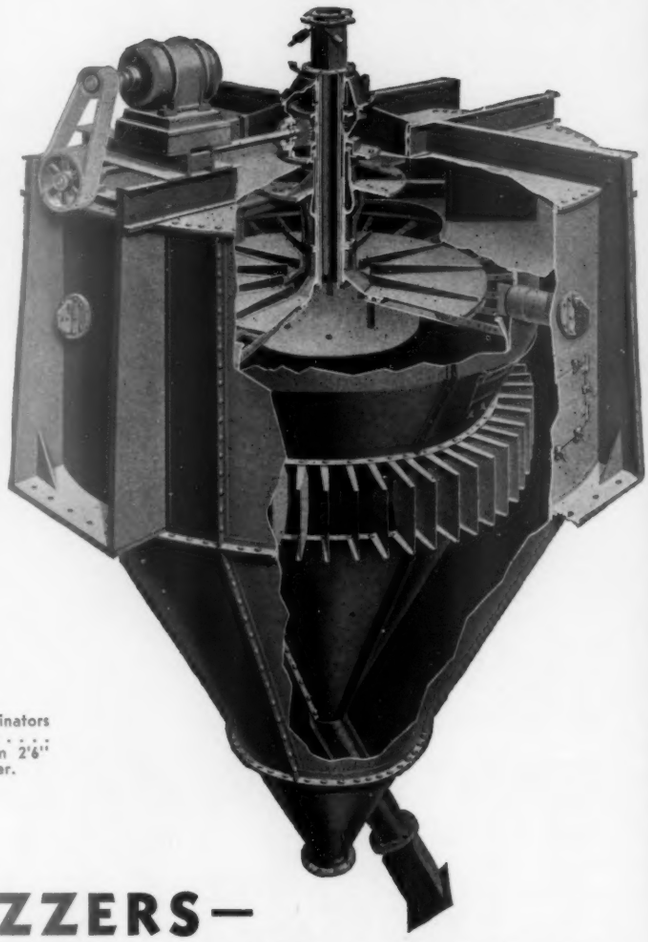
Higher Mill Capacities

Particle Size Control

Lower Production Costs

RAYMOND RECORDS

OF SEPARATOR PERFORMANCE



Built by the Originators of Air Separation . . . . in Nine Sizes from 2'6" to 18' diameter.

WHIZZERS—

Specially adapted for "High Early" Grades

As cement specifications become harder to meet, the demand for Raymond Mechanical Air Separators continues to increase . . . . for these machines are able to produce the finer grades of cement at a high rate of capacity that keeps down production costs.

The patented revolving whizzer gives the close separation of the fines and the uniformity of particle sizes, so necessary in making the quality cements required today. New efficiency in classifying HIGH EARLY STRENGTH CEMENT is made possible by the double whizzer arrangement now provided in Raymond Separators where extreme fineness is wanted.

This equipment will enable you to separate considerably finer than produced with ordinary installations, and you can readily obtain finished material testing up to 3000 specific surface area. Bulletin on request.

Note these results on CEMENT

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56% Greater Output

Production of 180 bbl. per hour obtained with Whizzer Separator in closed circuit, compared to 115 bbl. from grinding mills in open circuit operation.

14% Power Saving

Reduction from 5.33 KW per bbl. down to 4.55 KW by introducing a Whizzer Separator into closed circuit system with tube mills.

40% Higher Test

On cement classified with Whizzer Separator, tests upon one-day-old and two-day-old cements showed an average increase of 40% in tensile strength over that of cement from mills alone.

75% Increase in Specific Surface Area

In making high early strength cement, Whizzer Separator produced finished material testing 2450 surface area, as against 1400 for ordinary cement from mills alone.

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING CO., INC.

1321 North Branch Street CHICAGO

Offices in Principal Cities . . . . . Canada: Combustion Engineering Corp., Ltd., Montreal

WISSCOLAY PREFORMED WIRE ROPE

ALWAYS SPOOLS EVENLY

Haphazard winding greatly shortens the life of Wire Rope

Select the Rope that Fits Your Job

A Preformed Rope always runs straight. When spooling it on the hoisting drum there is no tendency for it to travel sidewise because it does not rotate around its own axis. Spaces are not formed between rounds. Subsequent layers fit evenly within grooves formed by closely fitting rounds of the underlying layer. Due to its smooth winding tendencies Preformed Rope does not suffer from early destruction by abrasion and crushing. Longer life because of better spooling is only one of the many economies of Preformed Wire Rope. Write us and we will gladly tell you if Preformed Wire Rope is best suited for your particular use of wire rope.

WICKWIRE SPENCER STEEL COMPANY, *General Offices:* 41 East 42nd Street, New York. *Sales Offices and Warehouses:* Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; *Export Sales Dept.:* New York.

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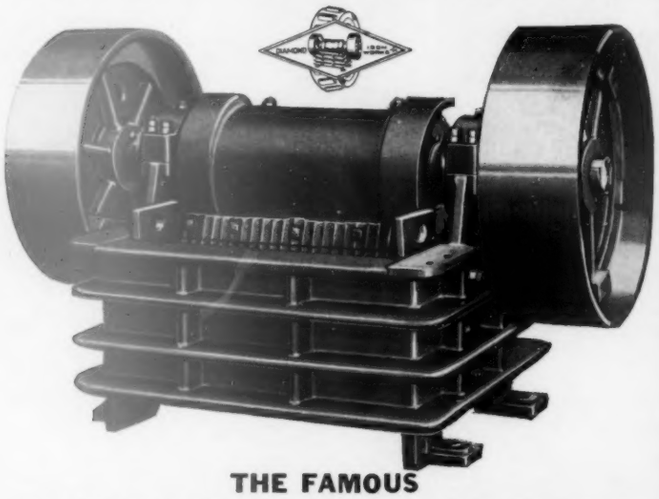
BUY DIAMOND *Anti-Friction Equipment*

CAPACITY • ECONOMY • LONG LIFE



THE FAMOUS
DIAMOND ROLLER-BEARING JAW CRUSHER
SAVES HORSEPOWER • OIL • MAINTENANCE

PORTABLE
ROTOR-LIFT and QUARRY PLANTS
A COMPLETE LINE OF VIBRATOR SCREENS, FEEDERS, ETC.
FOR CRUSHING, SCREENING AND CONVEYING
SAND • GRAVEL • ROCK

• Diamond Roller-Bearing Jaw Crushers occupy an enviable place in the industry. Made in several sizes -- ruggedly built to withstand long, efficient use — they are accepted leaders in value.

Under full load — will start with greatly reduced power and operate at a saving over plain bearing types.

Oil consumption is at a minimum and maintenance costs are unusually low.

For a complete plant or individual units
SEE YOUR DEALER OR WRITE DIRECT

DIAMOND IRON WORKS, INC.
AND THE MAHR MFG. CO. DIVISION
MINNEAPOLIS, MINNESOTA, U. S. A.

BUCYRUS-ERIE

BIG pay loads

are assured with Bucyrus-Erie Bullgraders and Bulldozers. Fast blade travel with positive, hydraulic control increases work range, while balanced design makes full tractor power available to move big pay loads and cut dirt-moving costs. Write for bulletin.

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The Walker is doubly effective at the pit, quarry, or mine. When not turning in a big daily output at stripping, it holds the production spotlight in digging and loading coal or gravel. The Walker's exceptional output is possible because this fast-digging unit steps directly toward the desired location and saves time moving. Manufactured by Bucyrus-Monighan Co., Chicago, Illinois.

BUCYRUS MONIGHAN

Sold by
BUCYRUS-ERIE CO.
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RED ARCH dragline buckets are stronger, lighter, faster . . . designed to meet the heavy loads and increased speed demanded of modern excavating equipment. Red Arch buckets dig easily, dump cleanly and resist wear . . . they are the choice of operators who want the maximum in low-cost, high-output performance. Write for bulletins.

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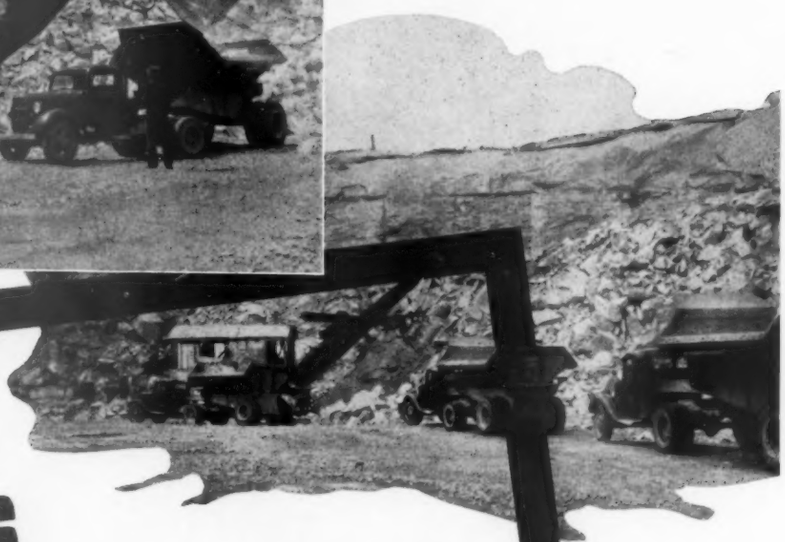

EASTON TRAILERS PROVIDE *Economical, Mobile* TRANSPORTATION FOR THIS PLANT

The Raleigh Granite Company, Raleigh, N. C., uses three Ford tractors with two 8-cu. yd. and one 10-cu. yd. Phoenix Bodies mounted on EASTON steel two-way side-dump trailers to haul stone from the quarry face to the primary crusher at its Rolesville, N. C. plant. (Description of this plant in this issue).

These tractor-trailer units are hauling double the amount of rock hauled by the three trucks which they replaced. The fuel, lubrication, and maintenance costs were substantially reduced. An Easton automatic dumper at the primary crusher contributes to the increased speed of operation.

Easton trailers have two unique features which add to their efficiency and steadiness . . . . elimination of sub-frame and use of helical springs instead of leaf springs.

Easton builds quarry transportation equipment to meet every need. Our representative will be glad to discuss your problem and help you select the type best suited to your requirements.

EASTON CAR & CONSTRUCTION CO.

Holly St., Easton, Penn.

We lubricate EACH WIRE TO INSURE LONG LIFE

AMERICAN TIGER BRAND WIRE ROPE

American Tiger Brand Wire Rope
Electrical Wires & Cables
Amerclad All-Rubber Cables
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Tiger Wire Rope Slings
Tiger Wire Rope Clips

LUBRICATION at each point of contact in wire rope is of equal importance to that in any complicated machines*. It reduces external wear, prevents corrosion, cuts down internal friction and enables each strand to move freely — all of which results in increased useful life.

Every wire of American Tiger Brand Wire Rope is carefully lubricated. This adds vitally to the flexibility of the rope, enabling it to withstand the terrific jerks of starting and stopping.

This lubrication is the result of years of engineering and field experience and is but one of the many different features which make American Tiger Brand Wire Rope a profitable operating investment for you.

American Tiger Brand Wire Rope is available in either Standard (non-preformed) or Excellay (preformed) constructions.

*** Machines? Absolutely, wire rope is a machine. It fits perfectly the dictionary definition, "Any combination of mechanism for utilizing or applying power."**

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UNITED STATES STEEL

A QUARRY SHOVEL with EXTRA Advantages!

LONG ago Northwests won their spurs as "Good Rock Shovels." They became the choice of contractors in the tough work of "pioneering."

They proved themselves in quarries and pits all over the country because they had quarry advantages that are exclusively Northwest.

The Northwest Independent Crowd brings you extra digging power through utilizing force that other shovels waste.

No Northwest Welded Boom has ever failed. Crawlers are flat and each tread has a roller support.

The "feather-touch" clutch control makes the handling of rock easier and increases output. The cushion clutch relieves strains on all parts under power, and increases machine life.

These are extra advantages that make Northwests better quarry shovels.

There is a size for every problem —3/8 cu. yd. capacity and larger.

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

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Williamsport

Purple Strand "Form-Set" handles more work in longer service

Every day this reliable wire rope, preformed the Williamsport way, is handling more work on more and more operations. All because the operators want ropes that last longer, do more work. Purple Strand "Form-Set" is exceptionally able to handle work more economically because it's built to wear better.

It is composed of highest-strength wear resisting wires, drawn uniformly through our Carboloy dies and preformed the Williamsport way to lay tightly permanently. "Form-Set" handles more work at less cost because it lasts longer in operation. Where preformed rope suits your operations, why not replace with Purple Strand "Form-Set" and see for yourself its outstanding value.

In sending for your wire rope manual, describe your equipment.

WILLIAMSPORT WIRE ROPE CO.

Williamsport, Pa. 122 So. Michigan Ave., Chicago, Ill.

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GO Where the profits are ...WITH AN A-W PORTABLE

● Be prepared to handle those good-margin jobs that are beyond the fringe of your economical hauling range.

An A-W No. 100 lets you in on these jobs. Big in capacity, powerful and efficient—yet mounted on pneumatics for highway transport—low center of gravity for travel over uneven ground. Sets up for work in an amazingly short time—and outperforms any crushing plant of its size you've ever known.

With an A-W Portable as an auxiliary to your fixed plant, you're ready for *any* job. You'll then have a more well-rounded, balanced business that means far more extra profit than your portable plant has cost.

The A-W No. 100 Plant is built to deliver volume, day-in and day-out. It's easy on power and easy on itself. For highest crushing speeds the primary breaker has unusually deep jaws, oversize roller bearings throughout, and extra strong oversize shafts. The secondary crusher, jaw or roll type, has equally rugged roller bearing construction, assuring the maximum in crushing output at low operating costs.

Look into the profit possibilities of an Austin-Western No. 100 Crushing Plant. Send for literature and costs.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
AURORA, ILLINOIS

Austin-Western

The Austin-Western Road Machinery Co., A-7, Aurora, Ill.

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CR750

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Now NITRAMON

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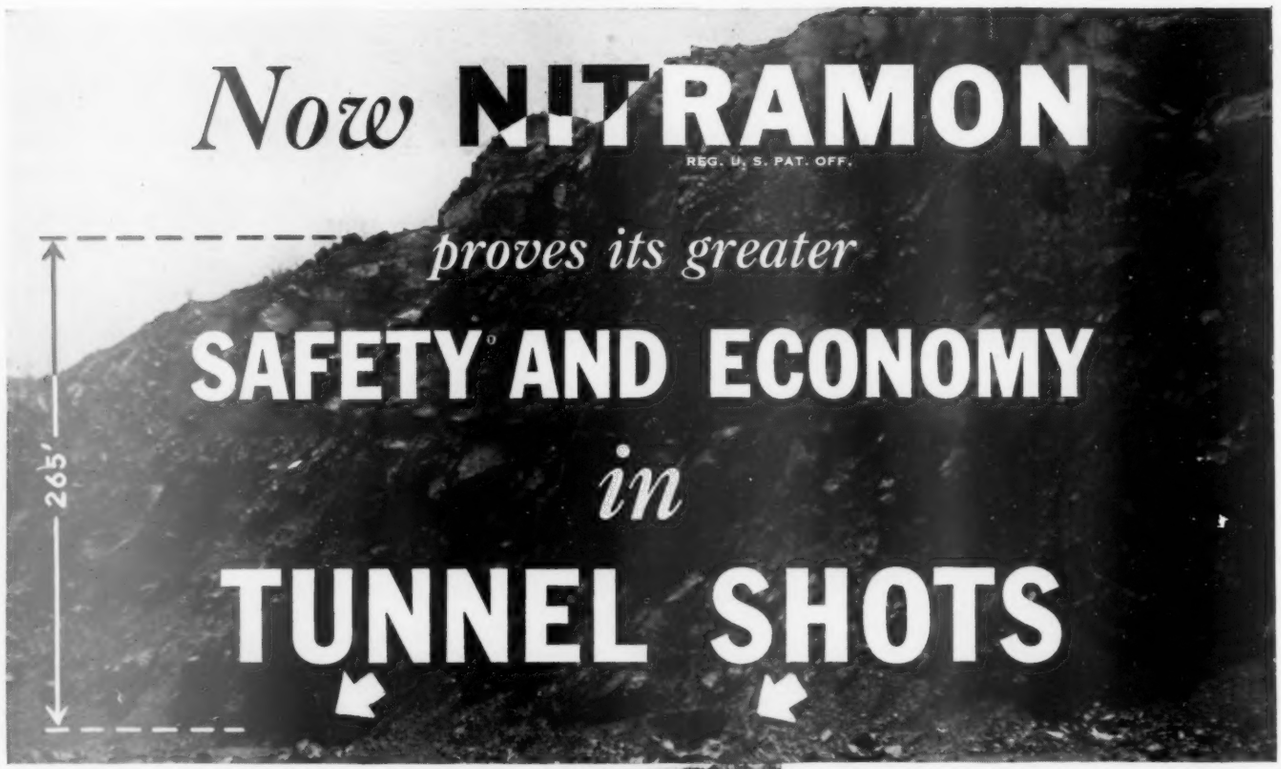
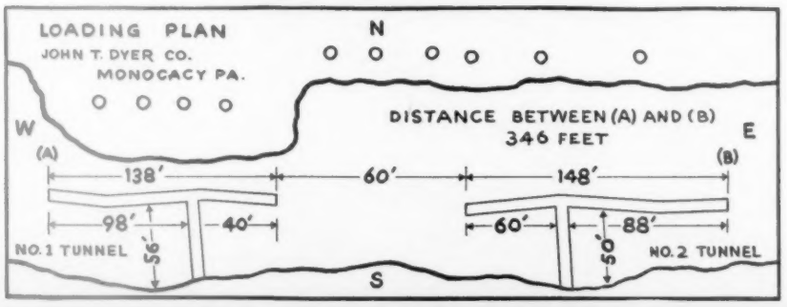
SAFETY AND ECONOMY *in* TUNNEL SHOTS



53,000 pounds of Nitramon were loaded in two tunnels and ten well drill holes in six hours at the John T. Dyer Quarry at Monocacy, Pa. Over 300,000 tons of stone were brought down with fine fragmentation. Very little, if any, secondary blasting will be necessary.

After the shot. Notice fragmented rock thrown well away from the face in good position to be taken up by the shovel.

Loading plan showing position of tunnel and well drill holes.



NITRAMON has already proved that it is safer and more economical in well drill shots. Now it has proved the same advantages in tunnel shots.

It is more economical because it loads quicker. Tunnels may be brightly lighted with electric lights instead of "flashlights." The air in the tunnels stays clear and pure because Nitramon contains no nitroglycerin. It produces no headaches.

Nitramon is safer because it cannot be fired until a special primer is placed in direct contact with the load.

That's why quarrymen everywhere say: "We are surely satisfied with Nitramon. It gives us lower costs per ton of rock moved —and is safer."

For further information, address E. I. du Pont de Nemours & Co., Inc., Explosives Department, Wilmington, Delaware.

DU PONT

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NITRAMON

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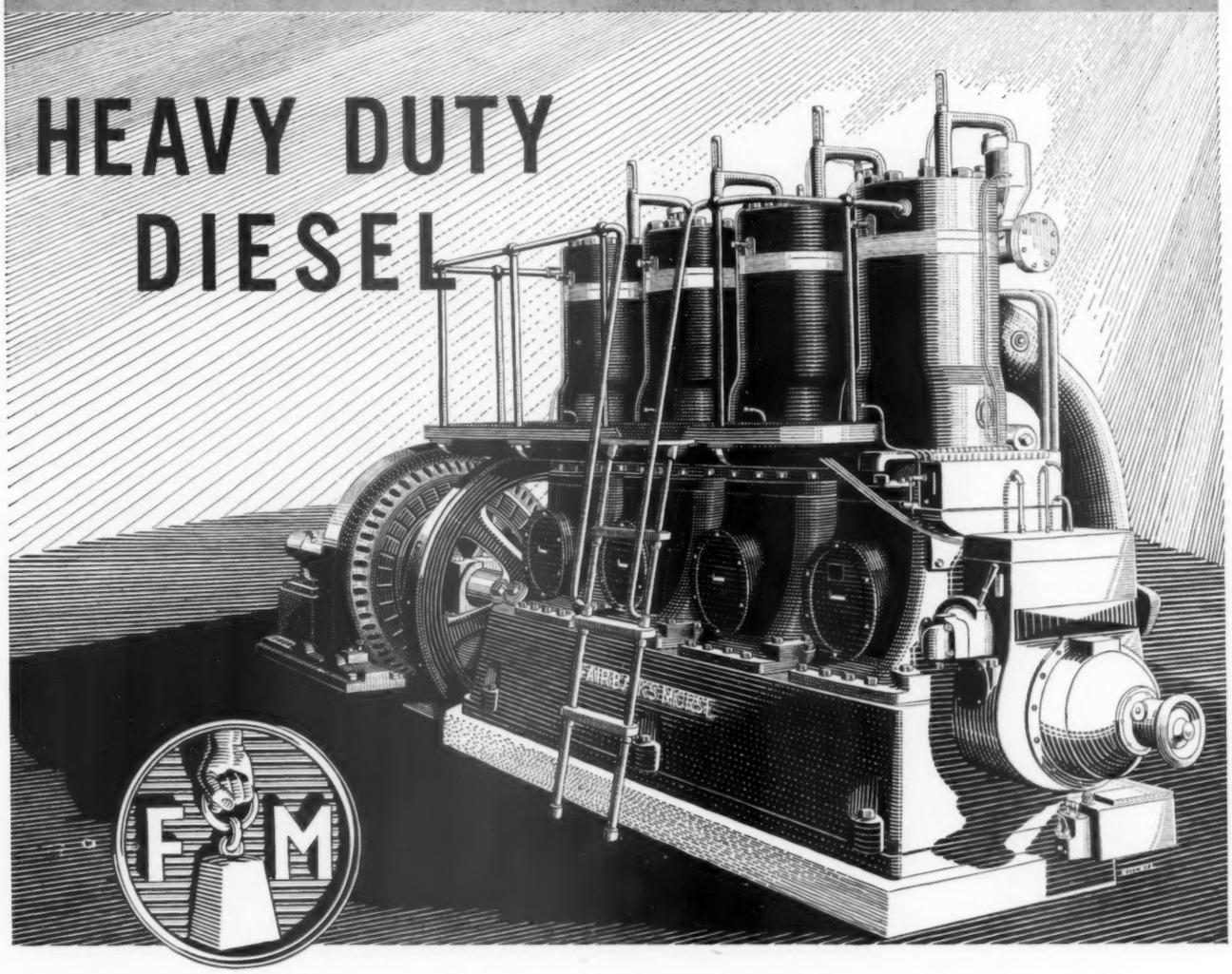
THE APPROVED BLASTING MATERIAL

SAVE MONEY BY BUYING A—



Diesel power for economy? Of course! But before you buy *any* Diesel, of any speed, of any rating, of any duty, consider this:

Fairbanks-Morse makes both light- and heavy-duty engines. Because we are in the position to offer engines of any type, we make this recommendation. Heavier duty, two-cycle engines cost but slightly more than smaller, light-weight, high-speed engines—but they present certain definite advantages to most buyers of power.

Being simpler in design, having fewer moving parts, being able to burn fuel with considerably greater efficiency, and being free from peak-and-valley efficiencies between grinding periods, heavy-duty two-cycle engines offer greater economy, longer sustained efficiency, lower maintenance, reserve power for tomorrow's needs.

When you consider Diesel power of any type, buy only after a careful analysis of your own problems, and a thorough consideration of the extra advantages F-M Model 32 Diesels have to offer you. For your copy of Bulletin K-811 address Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago, Illinois. 34 branches at your service throughout the United States.

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PUMPS • FAIRBANKS SCALES • RAILROAD
EQUIPMENT • FARM EQUIPMENT • HOME
APPLIANCES • HOUSEHOLD PRODUCTS • HEATING AND AIR CONDITIONING EQUIPMENT

F M

Diesels

KOEHRING

251 SHOVEL

High speed excavation with the Koehring 251 Excavator is assured by the many modern features of this popular 5/8 yard shovel. Light weight, high line and selective swing speeds, highly responsive clutches, and anti-friction bearings are important factors contributing to high production.

KOEHRING COMPANY

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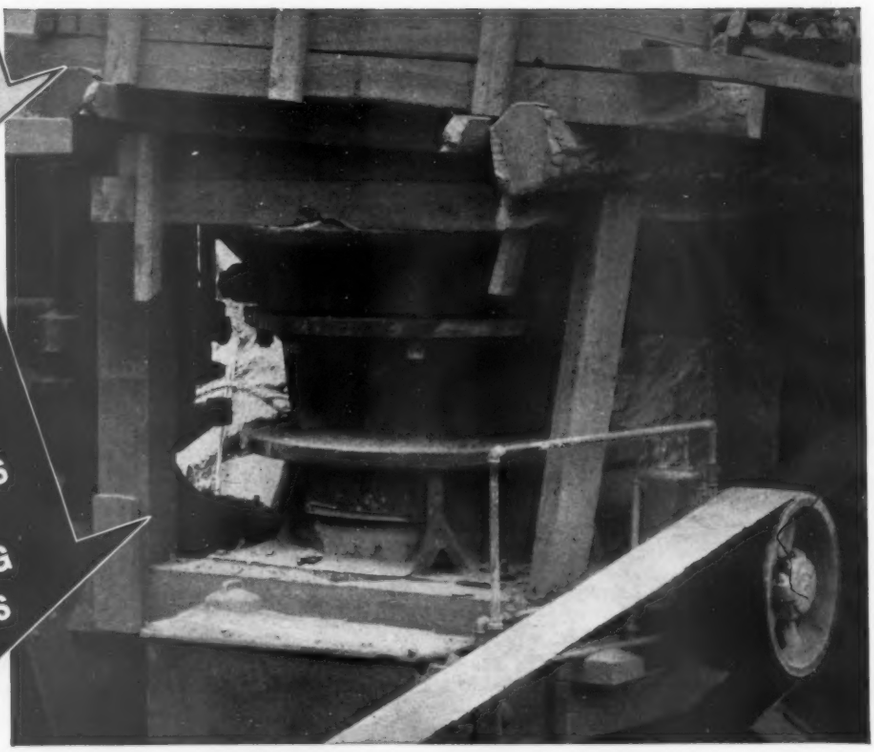
3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

If YOUR TELSMITH CRUSHERS WERE PURCHASED *prior to 1931*

Speed Up CRUSHING • IMPROVE PRODUCTS *by* MODERNIZING OLD CRUSHERS



TELSMITH

OUTSTANDING IMPROVEMENTS

INCREASE CAPACITY 25%

You are losing profits every day, if your crushers are more than six years old—so remarkable are the improvements made by Telsmith since 1931. In today's *high-speed* models, Telsmith's margin of crushing superiority is more marked than ever before. Dozens of operators are finding the way to extra output and extra profits by modernizing Telsmith machines or by replacing less efficient crushers with modern Telsmith units.

Telsmith Crushers are now equipped with cut gears, roller-bearing countershaft and improved oiling system, permitting much higher crushing speed. Not only have the gyrations per minute been multiplied, but *the rock is crushed by impact*—resulting in bigger output, a finer product, more cubical rock. These statements are not based on guess work or mere shop tests, but on results obtained by reliable operators—men you know—men who will confirm these statements. Why not find out? *Write for Bulletin C-15.*

TELSMITH MODERNIZATION SERVICE

If you are now using Telsmith *steel crushers* (Primary Breakers or Reduction Crushers) that are over six years old, they can be modernized for high-speed impact crushing by the incorporation of Telsmith improvements—at a moderate cost. *Write* for the facts and figures on this service.

● We do not recommend that the older cast iron and semi-steel crushers be operated at modern high speeds because of their vulnerability to breakage by tramp iron.

Associates in Canada: Canadian Ingersoll-Rand Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver HS-3

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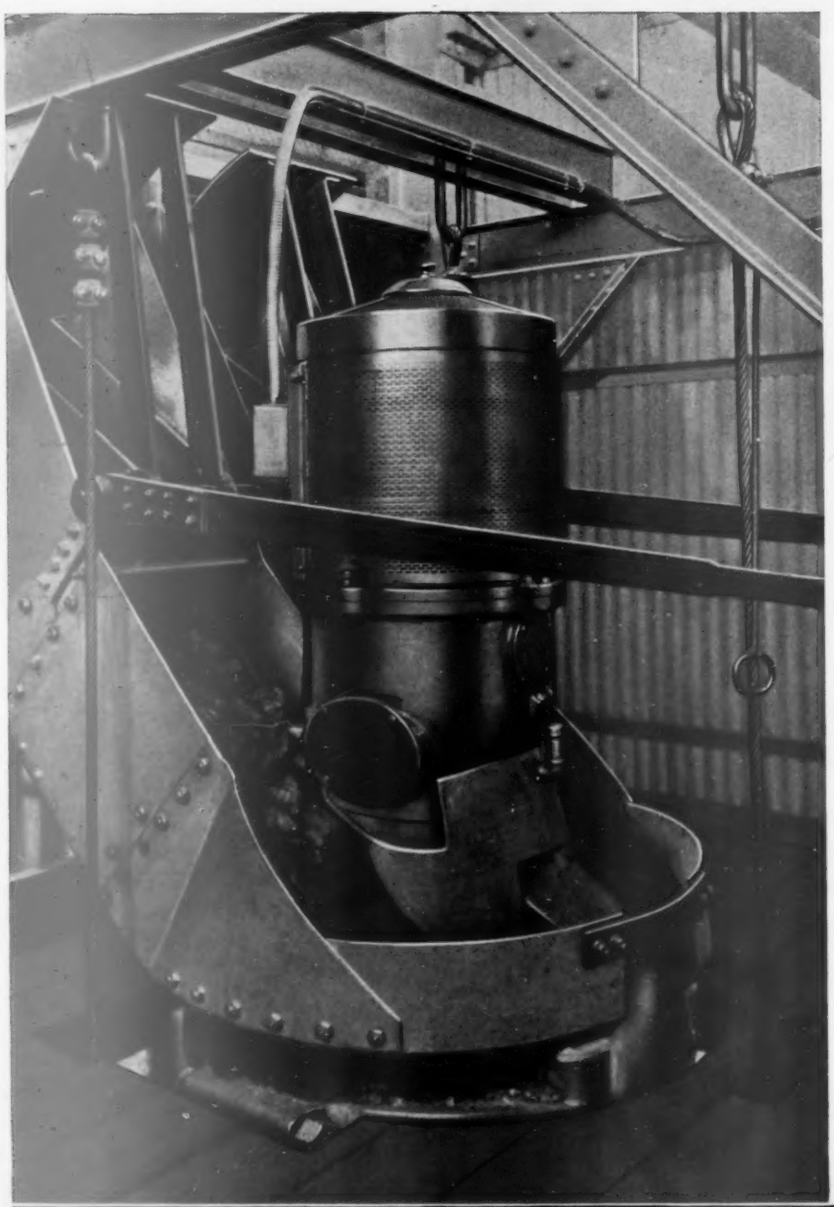
SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE, WIS.

Proven
BY EVERY TEST



A PROMINENT Ohio commercial stone plant made the following tests on an Allis-Chalmers Newhouse Crusher, to prove to their own satisfaction that they had selected the best crusher for their job.

A test, which was of long duration was made on a 10″ Newhouse Crusher driven by a 125 hp, 495 rpm motor. The setting was 9/16″ on the close side with a ½″ throw eccentric. The maximum power input to the motor was 100 hp.

All of the material crushed was passed over two 4′x8′ vibrating screens, set in tandem, with ½″ square openings. This gave a product through this ½″ screen cloth and washed over an ⅛″ square wire which averaged 43 tons an hour for duration of test. This material discharged into a bin by itself and was weighed. The oversize and throughs averaged about an equal amount. This would bring the total material handled to approximately 86 tons an hour.

The feed to the crusher during the test was minus 5″ plus 2″. The product discharged from the 10″ Newhouse contained over 98% of material minus 1″ and only 6% of fines—⅛″ indicating very little dust.

EQUIPMENT ENGINEERS TO INDUSTRY

ALLIS·CHALMERS

MILWAUKEE WISCONSIN

with Republic Conveyor Belts

REPUBLIC Conveyor Belts have cut haulage costs to lowest possible levels in hundreds of industrial plants. With other production costs rising rapidly, a more efficient handling system may solve your problem of how to maintain profits without excessive price increases.

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New high records for efficiency are constantly being set by Republic Conveyor Belts. They will do the same for you.

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Manufacturers of HOSE
BELTING • PACKING
MOLDED PRODUCTS

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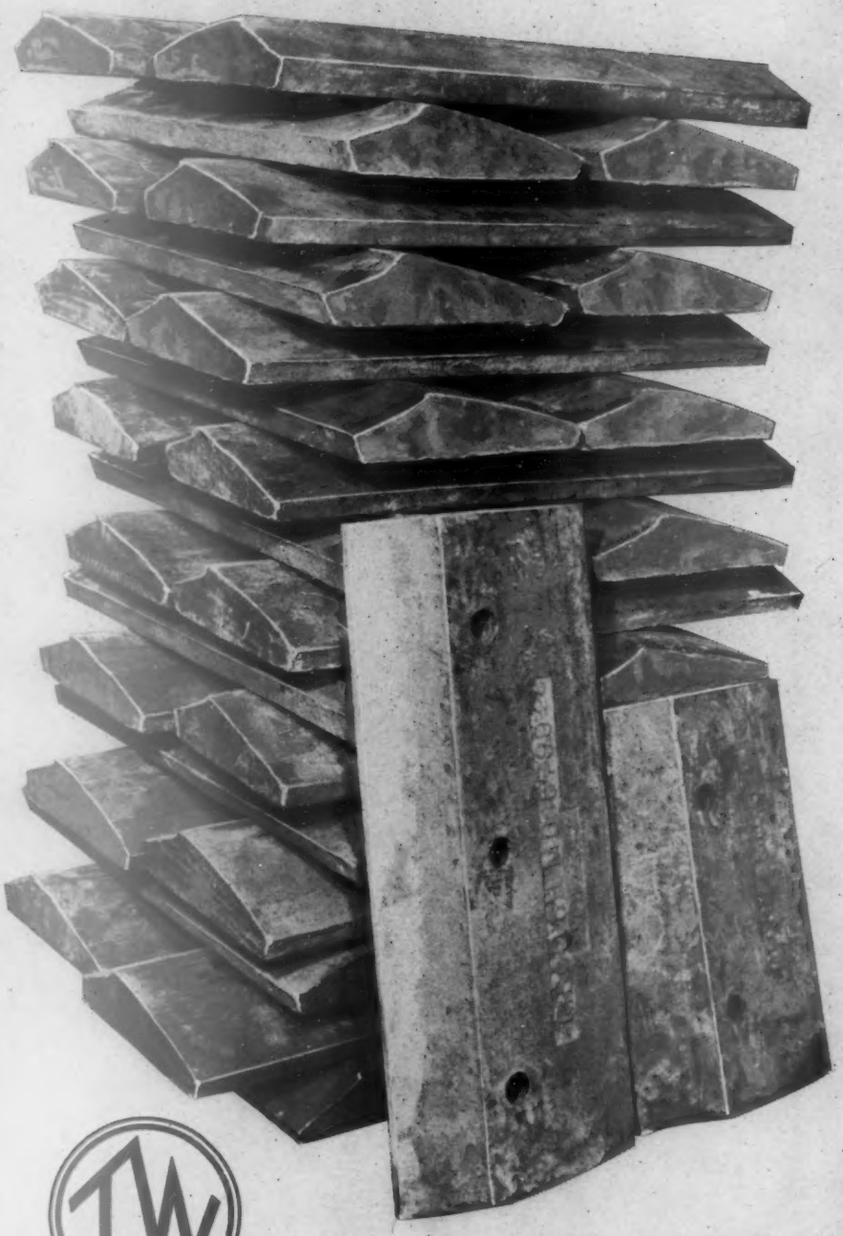
ORDER REPUBLIC RUBBER PRODUCTS FROM YOUR DISTRIBUTOR

For lower grinding costs . . .



TISCO

MANGANESE STEEL LINERS

Farsighted mill operators know that what's just a set of liners or jaw plates on the requisition sheet, is a *vital link* in *overall dependability* in the mill. That's why the name TISCO is so universally specified for all wearing parts. Operators know from experience that TISCO Manganese Steel *stands punishment longer* . . . that TISCO wearing parts save in maintenance and materials, and contribute appreciably to lower grinding costs. Be sure your equipment manufacturer furnishes TISCO for your new equipment, as well as for all replacement needs.

When you specify TISCO you get manganese steel of uniformly correct manganese content, carefully controlled in every manufacturing and heat treating process . . . with *maximum toughness and resistance-to-wear*. Be sure your crusher and mill parts, dippers, teeth, power shovel parts, buckets, conveyor chain, etc. are TISCO made.

TAYLOR-WHARTON IRON AND STEEL COMPANY

HIGH BRIDGE, NEW JERSEY

PLANTS AT HIGH BRIDGE, N. J.—EASTON, PA.

Offices:

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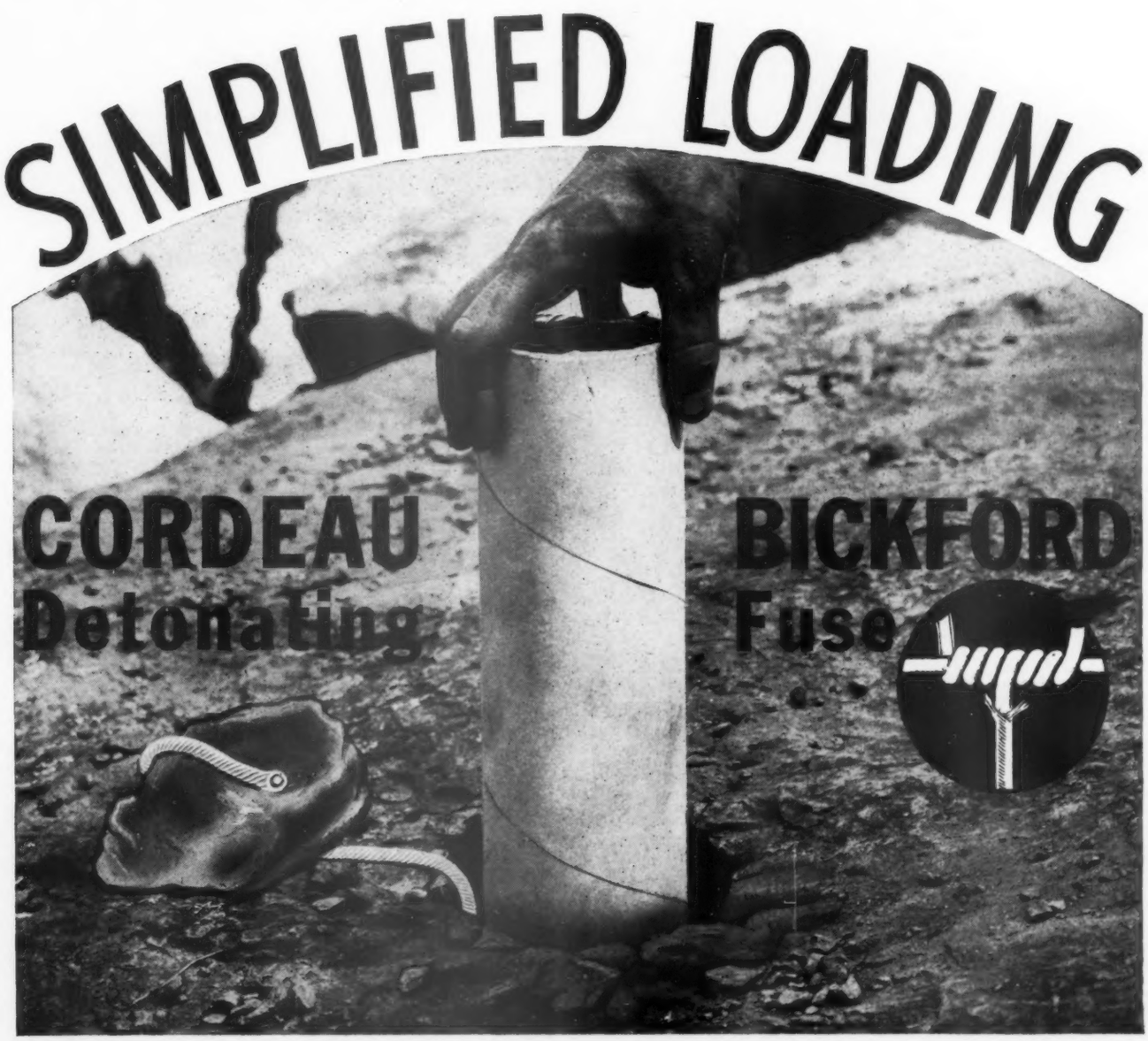
No caps in the Hole

The work entailed in loading bore holes has been simplified and made less hazardous through the use of Cordeau-Bickford Detonating Fuse. This insensitive material, acting as the connecting and detonating agent for each cartridge in each load, eliminated the need for sensitive detonating caps within the holes. Loading, stemming and tamping may be done as expeditiously as the proper handling of such blasting materials will permit. When the load is ready for blasting, the length of Cordeau detonates every cartridge in the hole—completely and simultaneously.

Time saved is money earned. Cordeau-Bickford will show increased efficiency on many types of jobs, both large and small.

THE ENSIGN-BICKFORD COMPANY • Simsbury, Conn.



HE-TIRES
FOR HE-TRUCK JOBS!

You'll Get Better Work, Cut Costs, With the Right ONE on Your Trucks

No matter how extreme the punishment, these three great Goodyears will outperform from the start—keep going long after ordinary tires have been discarded.

They're built that way—for long life under heavy loads in killing dump truck service. Bodies are the toughest made—of patented, pre-shrunk Supertwist Cord and chemically-toughened rubber—blowout protection in every ply.

But hauling over mud, dirt roads, fields, loose rock and excavations calls for a variety of treads. That's the reason for three—each for a special purpose—one for the exact conditions under which your trucks operate—one built to do your work better, longer and at lower cost than any tire you have ever known.

For example, the All-Weather Dump Truck Tire (1) is recommended for all-around dump truck work; the Pneumatic Lug Tire (2) where loose stones, sharp tread-wearing rocks are encountered; the Sure-Grip (3) for the mud, sand, soft-going.

With the *best made tire* and the *right type of tire* on your equipment, you'll be money ahead. Ask the Goodyear dealer near you for his recommendation for your trucks.

THE GOODYEAR TIRE & RUBBER COMPANY, INC., AKRON, OHIO

SEP 25 1937

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PIT AND QUARRY

Vol. 30 August, 1937 No. 2

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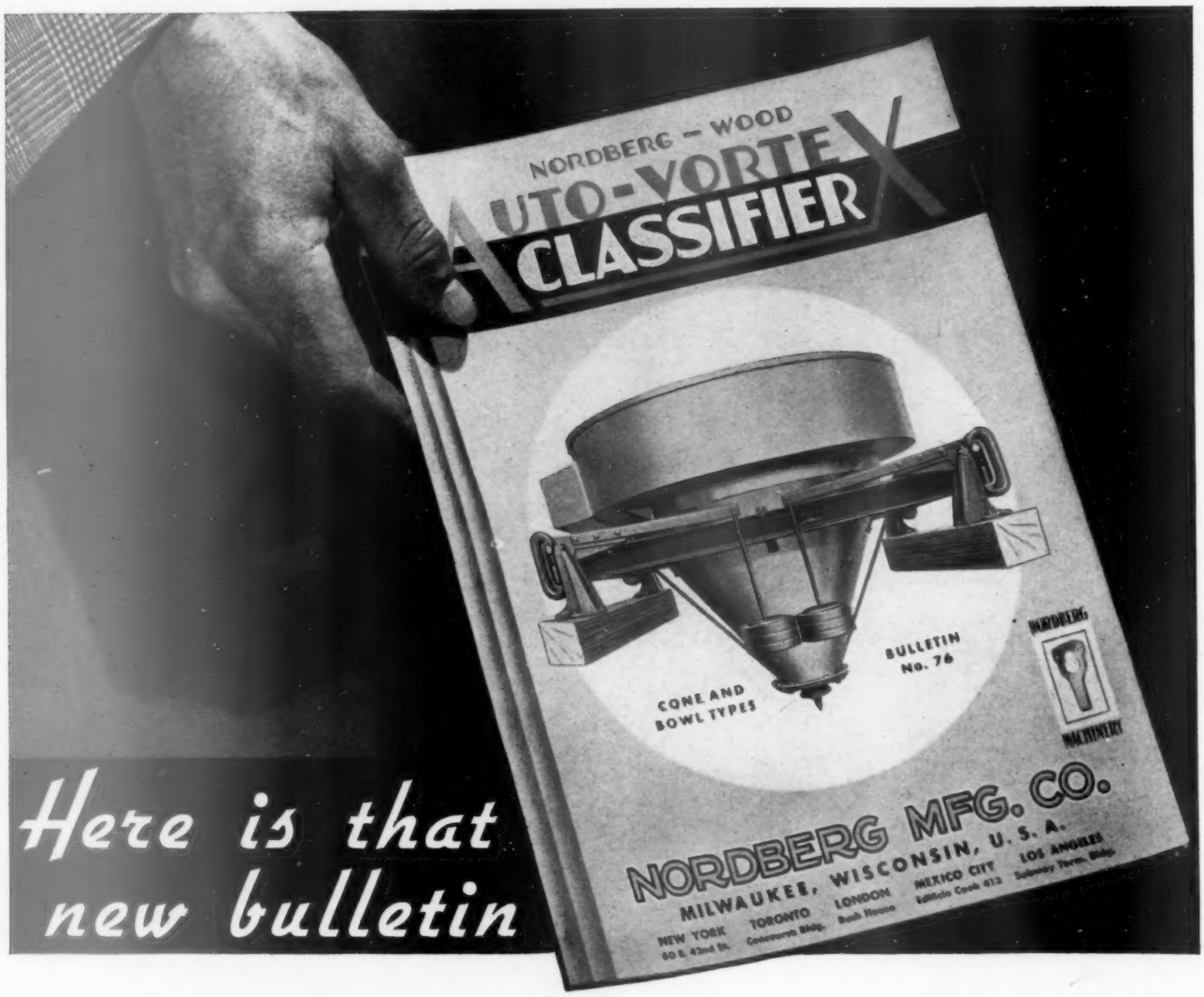

Here is that new bulletin

An Improved Classifier is now offered by Nordberg

Wherever sand and gravel are to be recovered and classified hydraulically, this latest addition to the line of machinery built by Nordberg merits investigation. Automatic action, sharp line of separation, no power required, wide range of adjustment and low headroom . . . . are but a few of the outstanding features of the Nordberg-Wood Auto-Vortex Cone Classifier.

Write for a copy of this new bulletin No. 76 or, better still, tell us about your classification problems. Additional information on this machine as applying to your specific problem, will gladly be furnished.

NORDBERG MFG. CO., MILWAUKEE WISCONSIN

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PIT AND QUARRY

CHICAGO AUGUST, 1937

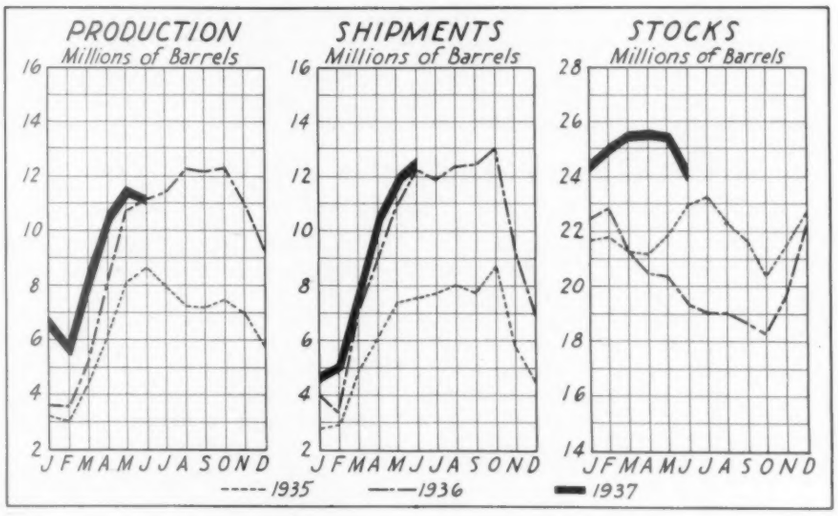
Building Recovery at Post-Depression Peak

ENGINEERING PROJECTS GAIN

Construction recovery reached a new high point in June, topping the previous recovery peak reported in July, 1936 by eight per cent. According to figures of F. W. Dodge Corp., the June construction total covering all classes of work amounted to $318,137,100 in the 37 states east of the Rocky Mountains. This was an increase of 30 per cent. over the figure of $244,112,800 for May of this year and represented a gain of about 37 per cent. over the June, 1936 total of $232,664,700.

Of the June, 1937 total, residential building accounted for $93,123,100; non-residential building took $125,087,000; while the remaining $99,927,000 went into civil-engineering projects, *i.e.*, public works and utilities.

Civil-engineering projects showed increases over June, 1936 figures in every district except upstate New York, the Southeast (The Carolinas, Georgia, Florida, Alabama and Eastern Tennessee) and the St. Louis territory.



The Portland-cement industry in June, 1937, produced 11,163,000 bbl., shipped 12,649,000 bbl. from the mills, and had in stock at the end of the month 24,015,000 bbl. Production of Portland-cement in June, 1937 showed a decrease of 1.9 per cent. and shipments an increase of 1.9 per cent. compared with June, 1936. Portland-cement stocks at mills were 24.6 per cent. higher than a year ago. The total production for the first half of 1937 amounts to 54,008,000 bbl., compared with 43,529,000 bbl. in the same period of 1936, and the total shipments for the first half of 1937 amount to 52,535,000 bbl., compared with 47,223,000 in the same period of 1936.

Dewey Portland Cement Co. Acquires Tyler Co.

Stockholders of the Dewey Portland Cement Co., Kansas City, Mo., have approved a merger with the Tyler Corp., together with a recapitalization plan and a number of amendments to the charter. The cement company will acquire the Tyler assets and will continue to operate as before.

The Tyler corporation, a sort of family holding company, and the Dewey company had a number of interlocking officers and directors, with F. E. Tyler as president of both. As a result of the merger Dewey Portland will receive the Tyler corporation's liquid assets and the Tyler stockholders will receive cement company stock. This, in substance, amounts to the sale of stock for cash (without any financing cost) whereby the cement company's financial position is augmented to the extent of more than $750,000, according to the president's letter to stockholders.

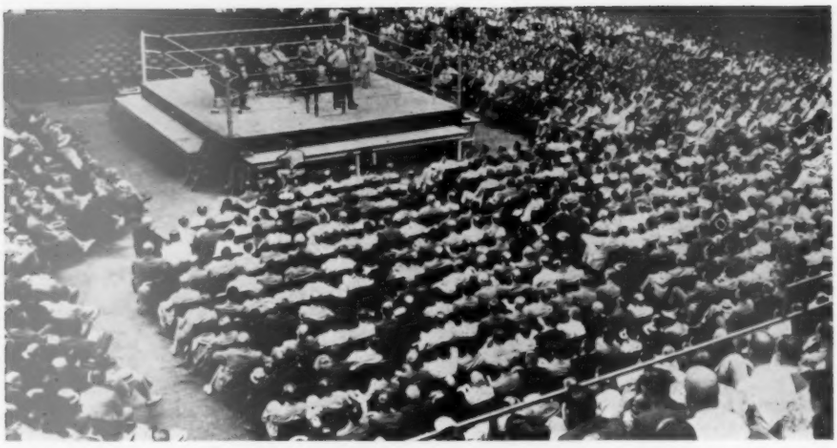
Anna Quarries Installs New Bituminizing Plant

★ An asphalt bituminous concrete plant is being installed at the Anna Quarries, Anna, Ill., to manufacture "black top" from stone produced at the local quarries. C. G. Gilmore is in charge, representing St. Louis interests who own the plant.

Modern Aggregates Plant Erected at Sanger, Cal.

Central Rock & Sand Co., of which Dr. Earl O. Vahue, Fresno, Cal., dentist, and Wallace C. McAllister, who for 15 years was with the Thompson Construction Co. of Fresno, are co-owners, has completed a modern sand and rock plant at Sanger, Cal. Equipment includes vibrating screens, and sand and rock are washed, with two large bunkers reserved for sand dewaterers. Modern "blending" equipment makes it possible to proportion and mix various sizes as desired when loading. The plant is intended to service territory within a 100-mile radius.

★ The United States Gypsum Co. has installed a 7-cu. yd. Page bucket at its plant at Alabaster, Mich.



Approximately 1,500 men and women affiliated with Kansas City business and industry met in the Municipal Auditorium recently and formed a Law and Order Club to demand the enforcement of the law in labor disputes. Seated at the extreme right on the wrestling-ring platform is John Prince, president of the Stewart Sand & Material Co., whose company has suffered much intimidation among its employees in recent weeks.

Members' Dues Increased by R. M. Concrete Assn.

Increased dues, based upon 1½ mills per cubic yard, have been put into effect by the National Ready Mixed Concrete Assn. It is estimated that this schedule will yield about $4,500 annually and will enable the organization to do more effective work in the fields of labor relationships, legislation and engineering promotion than heretofore.

Montana Marble Quarry Resumes Production

The Broadwater County Marble Quarry, located five miles southwest of Townsend, Mont., has been reopened by the Vermont Marble Co., with George Hough, of Radersburg, Mont., as superintendent. This quarry produces a "black and gold" marble, which takes a high polish.

Mica Producer Issues Attractive New Catalog

New England Mica Co., Inc., Waltham, Mass., has recently issued an attractive spiral-bound catalog of its products—built-up or bonded mica plates, which it furnishes in sheets, strips, tubes, punched and molded forms. These materials are made up from India mica films which are split to a thickness of .001 to .002 in. and pressed together with various types of binders.

★ The Clearwater Gravel Co., of Bagley, Minn., has purchased a gravel deposit near Crookston, and will establish a gravel plant there.

Corydon Stone Plant in Hands of New Owners

Sale of the Corydon Crushed Stone Co. quarry, Corydon, Ind., to the Severn, Bachman & Sons Co., of Lanesville, Ind., has been announced by Charles Keller, secretary-treasurer of the corporation.

The Corydon Crushed Stone Co. was organized approximately ten years ago.

Stone Producer Starts Making Concrete Bricks

★ With the addition of a Dunbrik machine to manufacture "Quartzite brick" from stone screenings, the Quartzite Stone Co. of Lincoln, Kan., has begun production of its fourth major product. The first three products are crushed stone, screenings to which oil is added to make a road-surfacing material, and concrete pipe. The brick-making venture, according to E. W. Forney, plant engineer, is attracting a great deal of interest and the bricks are selling well.

Concrete-Pipe Factory Opened at Paducah, Ky.

The new plant of the Kentucky Concrete Pipe Co. at Paducah, Ky. has gone into operation. The plant is owned and operated by H. D. Palmore, formerly connected with the Kentucky Highway Department as an engineer.

★ Elmer Fitzgerald, who is engaged in the sand, gravel and trucking business at Lebanon, Ore., is erecting a rock crusher and adding other equipment.

Pacific Coast Cement Firms Earn Profits

AGGREGATES FIRM HAS LOSS

The Riverside Cement Co. has declared the regular quarterly dividend of $1.50 a share on the preferred stock payable Aug. 1, to holders of record of July 15. The company has also declared a 25c. dividend in arrears on the Class "A" stock of the company.

Class "A" shares are still in arrears in the amount of $5.06 the total accumulation being in the amount of $1,200,000.

Another California producer, the Monolith Portland Cement Co., is paying a 25 c. dividend on the cumulative preferred stock on Aug. 15.

While the West coast cement companies are earning profits the Consolidated Rock Products Co., aggregate producer of Los Angeles, reported a net loss of $34,965 for the first five months of the year. This compares with a loss of $132,010 for the similar period of 1936.

Standard Slag Acquires Added River Frontage

Standard Slag Co. has purchased a 22-acre parcel of ground extending 1300 ft. along the Ohio River at Ironton, O., on which its Ironton plant is located, from the Marting Iron & Steel Co. The land has previously been held on lease, and the purchase was made to protect the plant and to secure additional storage space, according to the local announcement.

Spokane Firm Launches Concrete-Block Plant

Among the newest industries in Spokane, Wash., is the manufacture of concrete blocks by the Central Pre-Mix Concrete Co. at its plant at N. 805 Division, installed at a cost of more than $10,000.

Capacity of the new plant is 2,500 blocks per 8-hr. day. W. M. Murphy is president; John Murphy, secretary-treasurer; William Anderson, superintendent of production. The latter came from Grand Rapids, Mich.

★ The Gold Spring Company, of Morton, Minn., is installing a battery of three rock crushers, to be in operation early in August. This company has been operating quarries for a number of years but has never operated crushers.

Harry Ambler, Cement Superintendent, Dead

WAS WELL KNOWN IN INDUSTRY

Harry A. Ambler, superintendent of the Superior Portland Cement, Inc., plant at Concrete, Wash., died suddenly at his home at Concrete July 8, at the age of 42.

Mr. Ambler became connected with the Superior organization in March, 1922, as assistant chemist. He was later promoted to chemist and finally to the position of superintendent of the Concrete plant. He developed the company's Hyurly quick-strength cement, and was well known to men in the cement industry all over the country.

Mr. Ambler's home before going west was in St. Louis, Mo. He was a graduate of the Missouri School of Mines and a member of the Sigma Nu Fraternity. During the War he was a captain in the Army and received a citation from General Pershing and the Croix de Guerre.

Oregon Gravel Company Has Distributing Plant

A wholesale distributing plant has been established at McMinnville, Ore. by the Eugene Sand & Gravel Co. of Eugene, Ore.

Most of the sand and gravel handled through the new bunkers will be used in the paving and maintenance of highways in that vicinity.

Enjoy Barbeque as New Lime-Putty Plant Opens

Nearly 200 architects, engineers, contractors and others of the construction industry in Houston, Tex., attended a barbeque arranged by the Black-Broiler Co. early in July on the occasion of the opening of its new Brooks-Taylor lime-putty plant. The plant is being operated by the company's newly-formed subsidiary, Ever-Ready Mixed Mortar, Inc.

Truck mixers are being used for mixing the aged lime putty and sand into mortar enroute to the job.

West Virginians Lime 37,493 Acres of Land

Preliminary figures on participation of West Virginia farmers in the 1936 agricultural conservation program indicate that owners of more than 200,000 acres of land in that state received benefits under the program, according to a report from the agricultural extension division of the college of agriculture, West Virginia University.

Benefits totaling approximately $600,000 were paid to 17,000 West Virginia farmers, the report states. As a result of the program 63,890 tons of ground limestone or its equivalent were applied to 37,493 acres. Superphosphate totaling 8,655,850 lb. was applied to 34,339 acres.

Tax Commission Lowers Cement-Plant Valuation

Valuation of the abandoned plant of the Consolidated Cement Corp. located at Mildred, Kan., has been reduced from $158,850 to $104,000 by the Kansas State Tax Commission. The reduction was sought in a plea made by the company which stated that the plant has not been in production since 1931 and most of the equipment and machinery has been removed.

Reno Gravel Co. Enters Concrete-Mixing Field

★ Smith-Petersen Sand & Gravel Co., Reno, Nev., has formed a new company under the name of the Ready Mix Concrete Co., with Francis Smith as manager, to operate a ready-mixed concrete business. Special weighing equipment has been installed, and three mixer trucks have recently been purchased.

Tygart Limestone Buys Kentucky Ballast Plant

Poplar Ballast Co., Carter, Ky., has been sold to the Tygart Limestone Co. of Lawton, Ky., and repairs are being made to the plant. The plant works a deposit of limestone with a face of almost 100 ft. H. Watt Hillman is president of the Tygart company, and Sam Gearhart is the new manager at the Poplar plant

Gets Contract to Supply Gravel to W. P. A. Jobs

The Huntington Sand & Gravel Co., Huntington, N. Y., has been awarded a contract for the furnishing of all sand and gravel for WPA projects sponsored by Huntington Township for the period from May 27 to November 27. The bid was 80c per cu. yd. for sand and $1.60 per yd. for gravel, delivered on any job anywhere in the township.

★ A new kiln has been placed in operation at the Lime Crest, N. J., operations of the Limestone Products Corp. of America.

New Sulphur-Refining Plant in California

ORE [HAULED BY TRUCK FLEET

A sulphur-refining plant, said to be the only one of its kind installed in the United States, is under construction by Sulphur Diggers, Inc., at Zurich, a few miles east of Big Pine, Cal. Ernest Kleptko, former chief metallurgist for Anaconda Copper in Poland, has been retained to supervise operations.

The sulphur ore to be refined is hauled 67 miles from the Eureka Valley deposit by a fleet of 11 heavy-duty trucks. Formerly the ore was refined at the mine by a process of steam extraction. This method, it is said, was found to be expensive and ineffective because of the quantities of water required to be hauled to the mines.

8 Storage Silos Rising at Kansas Cement Mill

A force of 250 workers is busily engaged in erecting the eight new storage silos at the Chanute, Kan., plant of the Ash Grove Lime & Portland Cement Co. The new storage structures are replacing the old bins formerly used and are not increasing the storage capacity of the plant to any great extend.

Iowa Aggregates Plants Add Vibrating Screens

★ Many new installations of Universal vibrator screens have recently been made in Iowa stone and sand and gravel plants. The Legrand Limestone Co. has purchased additional units this spring, making about a dozen installed there. Northwestern Gravel Co. at Lakeview, another user of a considerable number, has recently installed three additional units. Hahn Brothers, Muscatine, has also recently purchased two additional screens.

Refuses Injunction to Halt Gravel Operations

A temporary injunction sought by the Town of Trumbull, Conn., to restrain the Sylvan Crest Sand & Gravel Co. from constructing and operating a stone crusher in Trumbull Center has been denied by Superior Court Judge Edwin C. Dickenson. The town had charged violation of a building code adopted on March 28, 1937, and the injunction was denied for lack of proof of the building code alleged.

Supt. Ewing Carter, right, of the Tennessee Coal, Iron & Railroad Co. Limestone Mine No. 5 near Bessemer, Ala., congratulates Earl Roberson, acting mine foreman, on the performance of his men in winning the 'Sentinels of Safety' trophy. The bronze award was presented under sponsorship of the U. S. Bureau of Mines. It is awarded each year in the non-metallic mine group of the national safety competition conducted by the bureau. The company's mine crew won the top prize by going through 1936 without a lost-time accident.

Topeka Sand Co. Files Plea for Dissolution

Voluntary proceedings in bankruptcy have been filed in the Federal district court by the Topeka Sand Co., Topeka, Kan. Total assets were listed at $12,228 and the liabilities at $11,650.32. A mortgage has been foreclosed against the company by C. R. Scott, and F. A. Laughead, former director, has brought a receivership suit in the Shawnee County district court.

Makers of Burial Vaults Adopt Fair Trade Rules

A general trade practice conference, under the auspices of the Federal Trade Commission, was held at Boston, May 5, for the concrete burial vault manufacturing industry. Proposed trade practice rules for this industry were made public May 28, and a period of 15 days was allowed for interested parties to present any suggestions or objections regarding the proposed rules.

Pre-Mixed Concrete on Anderson, Ind., Market

The McVaugh Ready-Mixed Concrete Co., Anderson, Ind., newly-organized concern, headed by Frank McVaugh, formerly county engineer, and including local business men, has leased approximately 30,000 square feet of building and ground space in the recently-remodeled United Trucking Service, Inc., building, and is operating a large plant for manufacturing ready-mixed concrete.

Three motor-driven mixers are in operation, and the company has received contracts including the order for all concrete used by the Indiana Bell Telephone Co. and its $50,000 improvement program, and other large construction jobs.

Retires After 35 Years Service With Lehigh

After being connected with the Lehigh Portland Cement Co., Mitchell, Ind. plant for more than 35 years, James Batman has resigned as chief clerk to take a well earned vacation. Victor Bixler, who for some time has been shipping clerk at the plant, has been named to succeed him.

The matter of health influenced Mr. Batman's decision to retire and confine himself to less activity and responsibility. He has been highly commended for the conscientious and efficient service rendered by company officials.

Opens New Ready-Mixed Plant at Desert Resort

★ E. M. Kirk, owner of the San Gorgonio Rock Co., has announced that he will install a ready-mixed concrete plant, delivery to be made in mixer trucks, about two miles northwest of Palm Springs, Cal. The plant will be installed within the next 60 days.

Grey Eagle Marble Corp. Resumes Work at Quarry

Operations are being resumed at the marble quarry near Flint Springs, Tenn., by Claude C. Cooper of Knoxville, for the Grey Eagle Marble Corp. of Knoxville. W. H. Ensley is superintendent.

New Agstone Operation Open in Oklahoma Town

Grand River Limestone Products, Inc., of which James W. Elliott is manager, has established a crushing plant near Fairland, Okla., to furnish agricultural limestone.

The Eastern Rock Products Co. of Utica, N. Y., has purchased the old Aquatite factory site in Sidney, N. Y., to conduct a stone, sand and gravel business. Alfred Pendlebury will be manager.

Kansas City Quarries Seeks Reorganization

ASSETS EXCEED LIABILITIES

Permission to file for reorganization under Sec. 77B of the Bankruptcy Act has been requested in the Federal district court by the Kansas City Quarries Co., Kansas City, Mo. The reasons assigned include a strike of the company's employees, together with the building-trades strike in Kansas City.

The company in its petition listed assets of $45,000 and liabilities of nearly $24,000. There are 8,000 shares of no-par-value stock outstanding, and 2,000 shares held for conversion of the bonded indebtedness, amounting to $9,700.

Two Mixer Trucks Serve Hutchinson, Kan., Plant

★ Hutchinson Supply Co., Hutchinson, Kan., is constructing an automatic batcher, bins and an automatic water tank for a ready-mixed concrete business, and is adding two mixer trucks to its equipment.

Lime Co. to Operate in Wallowa County, Oregon

The Northwestern Lime Co. has been organized at Portland, Ore., to take over the quarry and lime plant of the Black Marble and Lime Co. in Wallowa County. C. A. Bingaman, president and largest stockholder and creditor of the Black Marble and Lime Co., is reported to be interested in the new organization. The new company has put up money to pay all back taxes and to pay the expenses of the receivership.

Indiana Crushed-Stone Plant Adds Equipment

Approximately $20,000 has been spent in providing new equipment at the plant of the Newton County Stone Co. at Kentland, Ind. Including in the equipment installed are new crushers and vibrating screens.

Preparing to Excavate Marl at Michigan Pit

The Cass County Marl Mining Assn. is completing a road to its pit at Cassopolis, Mich., and has a crane on the job ready to start active operations soon.

Feldspar Industry Experiencing Boom

PRODUCTION AT ALL-TIME HIGH

The feldspar industry in 1936 produced more spar than in any prior year, sales of crude surpassing the 1928 peak by 16 per cent., according to the U. S. Bureau of Mines. Sales of ground spar also reached a new high. Increased consumption of feldspar by the glass industry was largely responsible for both records. Among the more important developments during the year were the steadily increasing importance of western feldspar, the active research program sponsored by the National Feldspar Association, the rise of new competing raw materials, such as nepheline syenite, and the extensive mechanical improvements to existing plants. Four new feldspar grinding mills were projected during 1936, 3 of them being either in operation at the end of the year or under construction with definite plans to start grinding operations in the early part of 1937.

Output of crude spar in 1936 totaled 244,726 long tons, valued at $1,303,090, an increase of 29 per cent. in tonnage and 30 per cent. in value over 1935. Large advances in production occurred in all the larger producing States, except Maine, whose output of 16,392 tons was 4 per cent. below the 1935 figure. North Carolina produced 102,393 long tons of feldspar in 1936, nearly 20,000 tons more than in 1935, but a percentage gain of only 24 per cent. Output in 1936 in other important producing States, with percentages of increase over 1935, follow: South Dakota, 32,144 tons (46 per cent.); New Hampshire, 26,494 tons (71 per cent.); Colorado, 25,806 tons (16 per cent.); and Virginia, 20,459 tons (38 per cent.).

Will Transport Cement to Northland by Plane

A 150-mile airplane trip is in store for 600 sacks of cement for the Mining Corporation of Canada's mine at Golden Lake, Northwest Territory, Canada, according to shipping instructions received at the Calgary, Alberta, branch of the Canada Cement Co.

The cement, which will weigh 25½ tons, will be shipped from the company's station at Exshaw on a Canadian Pacific Railway train to Edmonton, where it will be transferred to a Northern Alberta Railways train for movement to Waterways. At Waterways, it will be loaded aboard a barge and will travel up the Athabaska River to Athabaska Lake. From there it will go down the Slave River to Great Slave Lake, with a 16-mile portage *en route*. The cargo will be landed at Yellowknife bay, and flown the remaining 150 miles to its destination.

Wyoming Dealers Form New State Association

Sixty Wyoming firms who sell materials to county governments have organized the Wyoming Dealers Association, and have elected H. P. Gutz, Casper, manager of the Wyoming Concrete Products Co., president. The organization was perfected during a recent convention of county officials held at Casper.

Electric Storm Raises Havoc in Cement Mill

The Monolith Portland Midwest Co. cement plant near Laramie, Wyo., suspended operations for a period late in July because of lack of electric power caused by an electrical storm. Lightning struck a wire between the cement mill and a power plant of the Western Public Service Co.

National Gypsum Plans Board Plant at Mobile

The National Gypsum Co., Buffalo, is planning construction of a plant for the manufacture of insulation fiber board at Mobile, Ala. Original cost of the plant will approximate $1,000,000, but subsequent improvements may boost the total outlay to $2,000,000.

Another Mineral-Wool Plant at Wabash, Ind.

The Continental Rockwool Corp., 279 E. Main St., Wabash, Ind., has been chartered at Indianapolis to engage in the business of quarrying or mining rock. The firm has been authorized to issue 1,000 shares of stock having no par value. Incorporators are Emma Moore, Mary A. McCarthy and Margaret McCarthy.

Coogan Gravel Co. of Peoria Dissolved

Articles of dissolution of the Coogan Gravel Co., Peoria, Ill., have been filed with the Illinois Secretary of State. The company has maintained offices in the Lehmann Building, Peoria. Gilbert G. Geiger acted as correspondent.

G. L. & A. Board Is Retained After Fight

BATTLE OF PROXIES IS OVER

A long, drawn-out battle between shareholders regarding management of the Gypsum, Lime & Alabastine, Ltd., was settled recently with tabulation of proxies at the company's offices at Paris, Ont., Canada, which favored retention of the present board of directors headed by Col. H. Cockshutt.

A pledge of coöperation was immediately offered in behalf of insurgent shareholders who had sought return of R. E. Haire, who retired as active head of the company in 1932 at the age of 70.

Other members of the board headed by Col. Cockshutt are: J. E. McConnell, G. A. Dobbie, J. R. Inkster, S. G. Dixon, F. Andrews and C. Gordon Cockshutt.

"The shareholders and directors can now get together as one man," Col. Cockshutt said when results of the special election were announced. "As far as I am concerned, I am going to look after the interests of the company as long as I am chairman. I have no desire to show any opposition. Let's sink our differences. If it was for the interests of the shareholders, I would drop off this board right away. I am willing to shake hands with Mr. Haire or any one of his supporters and call it a day."

C. E. Silcox, one of the leaders of the insurgent shareholder group and whose family had held shares in the company for 40 years, explained reasons for pushing the action which resulted in the special election:

"We are not blaming anybody for the depression," Mr. Silcox said. "For results attributable to the depression, both Mr. Haire and the new management were blameless. But, in 1936, building increased by more than 50 per cent., and the company's business by only 6 per cent."

Frank Biggs, another shareholder, said that he had talked with dealers, builders and architects to find out the reason for this slow growth. The products were praised, but it was felt that the company was catering to the big customers at the expense of the small.

Particulars of an investigation of the purchases made by 12 builders in Hamilton, only one of which was using gypsum products, were given by Ernest W. Kay, another member of the insurgent group. Competitors were willing to fill the smaller orders and were getting all this lost business, he said.

. . . Editorial . . . . . .

Wages, Hours, Prices and Profits

IT IS TOO commonly assumed that the readjustments shown by our experiences of recent years to be necessary to continued wholesome social development can be accomplished by the adoption of some simple formula. Depending on the point of view and the special interests of the speaker, we are told that the true solution is to be found only in the shortening of working hours, the increasing of wages, the lowering of prices, the reduction of profits, the raising of working efficiency, or in a dozen or more other ways, which considered alone deal with only one of the many problems involved. Most of us fail to understand, or in many cases even to suspect, that in a pecuniary economy, such as the one in which we live but do not fully comprehend, each one of these factors is affected by and has its effects upon all the others, to say nothing of other causes and other effects which we either may never learn or can not now see because of preoccupation with those that momentarily enjoy public favor.

This confusion is "worse confounded" by the pseudo-helps to understanding issued by different organizations interested in achieving well-defined ends. Most of these are well fortified with facts, which may, when properly interpreted or selected, seem to prove a conclusion which they may actually even contradict. The choice of data is often made by those intent upon demonstrating a preconceived idea, but more often by those who, unaware of the magnitude of their task and hungering for a simple and ready answer, seize whatever facts seem to be important and present them with vastly more assurance than would a scientist announcing an important new discovery.

The relationship between technological advance and employment, for example, is one of the many subjects on which there is much confusion, and until more pertinent information is available there is not likely to be much improvement in understanding. Agitation for the thirty-hour week and other short work-weeks is based largely on the assumption that many of those now employed can not be re-employed because of the widespread use of machinery, that their number will, in fact, be increased by the further improvement of the mechanical means of production. It was not only his concern for temporary unemployment that led William Green, president of the American Federation of Labor, to write his pamphlet, *The Thirty Hour Week*. In that presentation he said in support of his plea, "For every 100 units of product turned out by an average factory worker in 1919, 171 are turned out to-day in the same amount of time. In 1919 the average work week in our factories was 52¼ hours. With a 71-per cent. increase in the worker's producing capacity, work which took about 52 hours in 1919 can now be done in 30 hours." Not long ago the Brookings Institution in its book, *The Recovery Problem in the United States*, offered data showing a 94.7-per cent. increase in man-hour productivity in manufacturing industries, from an index number of 62.4 in 1919 (based on 1929 as 100) to 121.5 in 1935. During the same period wage-earner employment fell an even 40 per cent., from an index number of 107.5 in 1919 (based also on 1929 as 100) to 64.5 in 1935. Since man-hour productivity is affected more by mechanical improvements than by changes in the skill of individual workers, the conclusion that technological advance results in reduced employment seems to be inescapable.

IF ALL the time economy achieved by the greater man-hour productivity due to increased mechanization were passed on to labor through the adoption of a work-week sufficiently short to absorb all the workers displaced by the increasing use of machinery, the gains that labor would realize would be time gains only—more leisure and not more income. Workers already employed would necessarily be required to work fewer hours in order to provide work for those not now employed, so that the total wage bill for producing a given quantity of product would be no larger, except for a slight increase that might result from some sacrifice in efficiency caused by more frequent changing of working shifts. A reduction in the number of hours of work can not possibly benefit the workers unless the hourly rate is at the same time increased, or unless the

prices of the commodities they buy — the cost of living — can be lowered.

In the seventeen years covered by the Brookings Institution's survey the cost-of-living index fell 24.2 per cent., from a level of 106.6 in 1919 (based on 1929 taken as 100) to 80.8 in 1935. In the same period the average yearly earnings of the average worker rose from an index figure of 83.3 in 1919 (based, as before, on a figure of 100 for 1929) to 101.9 in 1935, an increase of 22.3 per cent. Relating the latter figures to the former reveals the fact that average yearly earnings, expressed in terms of 1929 purchasing power, advanced 61.3 per cent. in those years, from an index of 78.2 in 1919 to 126.2 in 1935. This increase, which represents a betterment in the workers' standard of living rather than in leisure, is not equivalent to the 94.7-per cent. increase in man-hour productivity — the efficiency of labor as raised by the increasing use of machinery — and is, therefore, the basis of further argument for reducing the work-week as a means of compensating labor for the losses caused by technological unemployment.

Real income is, of course, the only true guide by which changes in the workers' economic situation can be measured, and this is practically synonymous with the difference between wage levels and price levels. If wages rise and prices rise to the same extent, the worker's financial condition is no better; he may, through a shorter week, have more leisure, but his higher income is absorbed by the higher prices demanded for what he must buy. If his wages rise more than commodity prices, his standard of living rises; and the same is true if prices fall, whether his wages rise or not. His chances for improving his economic condition are determined by the extent to which his "real" income grows, that is, the extent by which his money wages exceed his commodity prices.

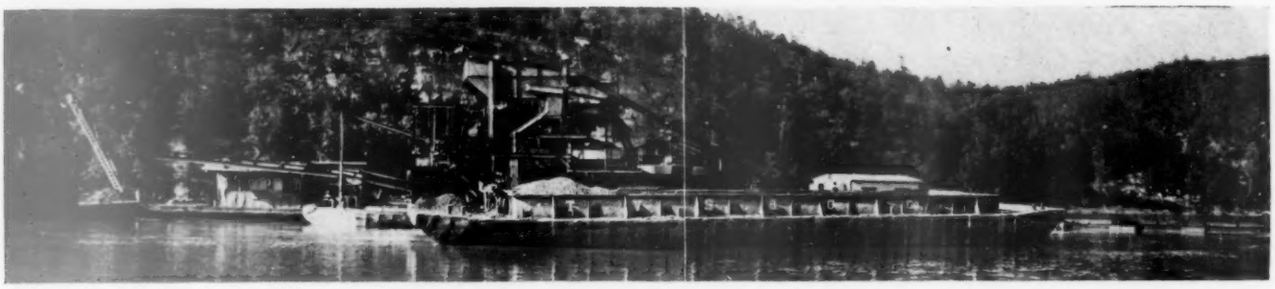
THERE are three ways in which money wages can be increased or in which they can be kept at their present levels while the work-week is shortened. Prices may be raised to take care of the increases, in which case a large share of the higher prices must be paid by the workers themselves; profits may be reduced, a method that is not likely to be adopted; or the efficiency of production can be increased. Most of the increase in the ratio of money wage rates to commodity prices that has occurred during the present recovery is due to improved production efficiency and to the lower prices of purchased materials and power; the remainder has come from the reduced unit production costs resulting from greater production. With it all industry profits have shown material increases which have made possible capital expenditures that have in their turn created more employment.

EVERY business man is anxious to enlarge his business profits, and the only sound method for accomplishing that on a permanent basis is to increase his production efficiency. He may attempt to attain the same end by raising prices, but the greater his understanding of the true relationship between wages, hours, prices and profits, the less will he allow himself to become interested in the ways of expediency. A temporary swelling of production, more in the nature of an abscess that a wholesome growth, may result, but, being built on a temporary foundation, it can not endure. If wages do not advance in proportion to price increases, there is no permanent gain, because the purchasing power of the masses, an essential element in the creation of economic soundness, has not been improved.

Every worker is anxious to better his economic condition, and only by a general and continuing increase in production efficiency can he expect to accomplish it. Rising wages, if offset by proportional price increases, leave his situation unaltered, for they merely force him to receive and disburse more money for the same services or goods without in any way raising his standard of living. His improvment can not come out of profits, since no employer will willingly accept a situation of declining profits without some compensatory relief in higher prices, and these will defeat the worker's objective through an increased cost of living. Raising prices reduces the demand, and as demand falls, the unit cost of production rises, furnishing still another reason for raising them further. Wages may then fail to rise proportionally, and the worker's position will become less comfortable and, perhaps, less secure.

Employers and workers have a common interest in avoiding price increases that are not, or can not be, accompanied by proportional wage increases. Both must be concerned about maintaining a spread between the two — an excess of wages above prices, of income above outgo. The greater that excess, the higher the standard of living, and the sounder the economic fabric of the nation. A better understanding of the interdependence of wage rates, working time, the pricing of products, the nature of profits, and the requirements of production efficiency will lead to greater economic security for both employers and workers and will insure an expanding outlook for material and cultural betterment for both.

AGGREGATES AND CONCRETE PRODUCTION



The suction dredge and floating screening plant operated by the American Aggregates Corp. at Guntersville Dam.

The two articles on this and the following pages are published to give commercial aggregates and concrete producers some idea of the methods being used in the preparation of materials and concrete for Guntersville Dam. Both articles are written by individuals well qualified to describe their respective subjects. The first article describes the aggregate storage and handling and concrete-mixing operations of the T. V. A. The second article describes the production of the aggregates by the contractor. This arrangement, putting the "cart before the horse", was considered advisable because the general description of the dam and other matter of an introductory nature is contained in the first article. Guntersville Dam is the fourth major construction project of the T. V. A. Complete descriptions of the methods of agregate and concrete preparation at the Norris, Wheeler and Pickwick Landing Dams have already been published in PIT AND QUARRY.

Concrete Production

By Herbert F. Gough

GUNTERSVILLE DAM, the Tennessee Valley Authority's fourth major construction project, is being built across the Tennessee River 10 mi. downstream from Guntersville, Ala. Though a smaller structure than the Authority's previous projects, Norris, Wheeler, and Pickwick Landing Dams, the Guntersville job is outstanding because of the compactness of the construction plant and the improved methods used in handling concrete aggregate.

In its general design Guntersville Dam resembles the Pickwick Landing project, which the Authority is building on the Tennessee 53 mi. below Muscle Shoals. When completed in 1940, it will be made up of a concrete section, including a navigation lock, a spillway, and a power-house, across the present channel of the river, flanked on either side by earth embankments extending to high ground. The dam will be 89 ft. high from the foundation to the spillway-gate operating platform and will have an over-all length of approximately 4,000 ft. The north embankment will be about 705 ft. long and the south dike about 1,860 ft. The dam will rest on a foundation of Bangor limestone.

The reservoir created by Guntersville Dam will be 99 sq. mi. in area at the normal level of elevation 594 and will create a navigable channel for boats of 9-ft. draft extending 82 mi. upstream to the foot of Hales Bar Dam.

A total of about 285,000 cu. yd. of concrete will go into the structures making up the middle section of the dam. The aggregate needed for the job is being dredged from the Tennessee riverbed, classified, and sent by barge to the damsite by the American Aggregates Corp. of Greenville, O. The contractor's suction dredge, *Columbus*, and floating classifying plant were located for a time at Fort Deposit Bar, 4 mi. upstream, but are now operating at a point only ½ mi. above the damsite. The average tow is made up of three barges, but operations are so coördinated that frequently a barge is called for as soon as loaded.

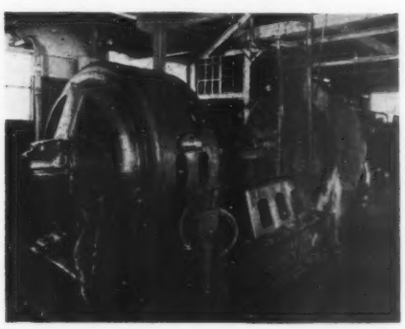
The Authority's contract with the American Aggregates Corp. calls for approximately 450,000 tons, divided as follows: coarse gravel 3-in. to 1½-in., 67,000 tons; intermediate gravel 1½-in. to ¾-in., 121,000 tons; pea gravel ¾-in. to No. 8, 108,000 tons; coarse sand No. 8 to No. 30, 77,000 tons; and fine sand No. 30 to No. 100, 77,000 tons. On the last two items the contract permits an alternate of 154,000 tons of completely-graded sand.

The live-storage bins with stock-pile storage system in background viewed from top of concrete-mixing plant.

FOR THE T. V. A.'S GUNTERSVILLE DAM

At the Authority's unloading dock on the north side of the river at the damsite, a Wiley Whirley, equipped with a 95-ft. boom and a Blaw-Knox 2-cu. yd. clam-shell bucket, transfers the aggregate from the barges to a stationary hopper. In emergencies a derrick boat equipped with an American Revolver with a 75-ft. boom assists in this rehandling. This latter unit is part of one of the floating mixer plants formerly used by the Authority at Wheeler Dam. The 150-ton Blaw-Knox hopper also comes from one of the Wheeler mixer plants.

A No. 5-M4 Jeffrey-Traylor electric vibrating feeder releases the material on a covered Barber-Greene conveyor which carries it on 30-in. Hewitt belting a distance of 443 ft. back from the river bank to the base of a radial stacker and reclaiming unit in the center of the main storage yard. The stacker and reclaiming unit is an entirely new piece of equipment developed by A. J. Ackerman, the Authority's construction plant engineer. It consists of a 113-ft. steel-guyed mast



The 15-in. heavy-duty dredge pump with its 400-hp. motor.

carrying a 160-ft. Barber-Greene stacker boom which distributes the material by means of a 30-in. belt into five separate ground-storage compartments.

During storage operations, the conveyor from the unloading dock discharges the aggregates into a hopper attached to the mast some 20 ft. up from the base. Two pipes controlled by a fly gate extend downward from the bottom of this hopper. The shorter pipe guides the material on the belt running the length of the stacker boom. Plows at fixed intervals along the belt divert the material into any section of the storage compartment desired.

Capacities of the five dead storage compartments are as follows: fine sand, 34,700 tons; coarse sand, 34,700 tons; pea gravel, 47,200 tons; ¾-in. to 1½-in. gravel, 52,500 tons; and 1½-in. to 4-in. gravel, 31,100 tons.

The navigation lock at Guntersville Dam shown when near completion several months ago.

In the reclaiming operation a Northwest No. 6 crawler crane working on the periphery of the storage yard picks up the material with an Erie 1½-cu. yd. clam-shell bucket and loads it back on the stacker belt through a small hopper on the extreme outer end of the stacker boom. During this rehandling, the stacker boom is in a horizontal position, resting upon a 10-ft. support which swings down from the boom truss. Reversed operation of the stacker belt conveys the aggregate back to the base of the mast and discharges it on the belt-conveyor to be carried away to the live storage bins.

In emergency the dead-storage plant can be by-passed and the aggregate moved directly to the live-storage bins. During this operation the material leaves the hopper on the mast by the longer of its two pipes, which carries the flow downward parallel to the mast and discharges on the second flight of belt-conveyor leading to the live-storage bins.

The two 4-ft. by 8-ft. triple-deck screens which make first gravel separation.

The second flight of 30-in. belt-conveyor is 294 ft. long and travels in a direction roughly parallel to the river. It is inclined to discharge to the live-storage plant, a cluster of five timber bins. These were constructed by the Authority's forces and have a total capacity of 2,300 tons. Aggregate at

The three 4-in. centrifugal pumps, which feed fine sand to electric vibrating screens.

the top of the bins is discharged on a short 25-ft. conveyor which operates radially to discharge into each of the five bins as desired. This conveyor has the same speed and capacity as the preceding conveyors, 292 ft. per min. and 400 tons per hr.

Material is discharged from these bins on a 24-in. inclined belt-conveyor which transports the aggregate 520 ft. to the bins in the top of the mixer plant located alongside the navigation lock. This conveyor operates at a speed of 286 ft. per min. and has a capacity of 250 tons per hr.

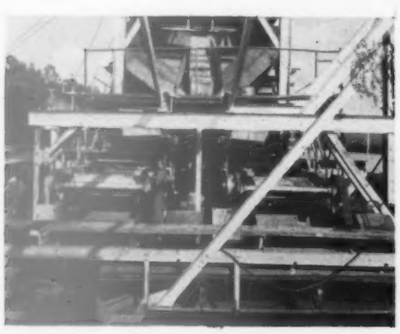
Cement for the concrete is shipped to the job in bulk on the N. C. & St. L. R. R. This railroad operates a ferry on the Tennessee River which extends 20 mi. from Guntersville downstream

Another view showing dredge at right and barges being loaded from floating screening plant.

to a point just above Hobb's Island. The Guntersville damsite is at about the half-way point in this ferry, and the Authority has constructed a spur line of standard-gage track extending from the concrete-mixing plant to an unloading ramp some ¾ mi. downstream. The cars of cement are hauled over this spur line to the mixing plant by a 30-ton Plymouth Diesel locomotive.

At the concrete-mixing plant the cement is fed by a 5-in. portable Fuller-Kinyon pump to a Palmer-Bee bucket-elevator, which lifts it into a 6,000-bbl. steel silo. This is the same Stupp Brothers elevated silo, 54 ft. high by 30 ft. in diameter, that the Authority formerly used at Coal Creek, Tenn., in the handling of cement for Norris Dam. The silo is located next the mixing plant, and the same bucket-elevator is used to effect the transfer from the silo to the bin in the top of the mixing plant. In this operation the loading bin at the base of the bucket-elevator is fed by a pipe equipped with blowers leading from the bottom of the silo.

The Authority's cement requirements for the Guntersville project form a part of a blanket contract with several cement manufacturers, who have contracted to fill the cement needs on a number of the T.V.A. construction jobs. It is estimated that about 350,000 bbl. will be needed for Guntersville Dam. This is being furnished by the following firms: Lehigh Portland Cement Co., Boyles, Ala., 25 per cent.; Penn-Dixie Cement Corp., Richard City, Tenn., 12 per cent.; Lone Star Cement Co., North Birmingham, Ala., 21 per cent.; Alpha Portland Cement Co., Phoenixville, Ala., 21 per cent.; and Universal-Atlas Cement Co., Leeds, Ala., 21 per cent.



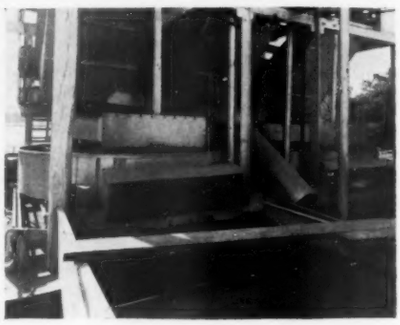
The two 3-ft. by 10-ft. screens used for sizing of fine gravel.

The cement used is Type B modified Portland cement, which gives off 70 calories per gram at the end of a 7-day period. When incorporated into concrete, it has a heat rise that is somewhat higher than the "low-heat" cement used at Boulder Dam, but lower than the ordinary "normal" Portland cement.

The concrete-mixing plant is a compact unit very similar to that used at Norris Dam. It is an 83-ft. steel structure fabricated by C. S. Johnson. At the top are seven overhead bins into six of which a turnhead diverts the various sizes of aggregate as they come up the inclined conveyor from the live-storage bins. Since only five sizes of aggregate are used, the spare bin is used for additional storage of any size needed in an emergency, dependent upon the type of concrete being made at the time. These six bins have a total capacity of 500 cu. yd. The seventh bin, for cement, is of 100-cu. yd. capacity. In addition there is a 3,000-gal. hexagonal water tank fed by a 6-in. pipe line leading in from two 50,000-gal. tanks located on a 230-ft. elevation about ½ mi. back from the river.

Located beneath the bins are the weigh batchers, two C. S. Johnson 55-cu. ft. multiple sets. Each set handles one type of sand and two sizes of aggregate. The filling valves are manually operated and the discharge gate is air-ram operated. The cement batcher, also a C. S. Johnson, is of 20-cu. ft. capacity with a screw-conveyor-type filling feeder. Both the filling valve and the discharge gate are air-ram operated. The C. S. Johnson water batcher is of 120-gal. capacity equipped with 6-in. filling valve and 6-in. discharge gate. The filling valve is electrically controlled. The discharge gate is automatic.

The scales, all furnished by Johnson, are of the overhead type, self-aligning, with swinging-pendulum dial. All are air-operated. The scales for the aggregate batchers are Kron, of 5,000-lb. capacity. The cement scale is a Toledo, 1,500-lb. capacity. That for the water is also a Kron, of 1,000-lb. capacity.



The two 8-ft. classifiers which split sand at 30-mesh.

The aggregates, cement, and water are discharged into two Ransome 56S 2-cu. yd. non-tilting, drum-type concrete mixers. One of these operates right hand, the other left hand. The discharge is air-operated. The production cycle thus far maintained has averaged about 2¾ min. per 2-cu. yd. batch. The maximum capacity is estimated at one 2-cu. yd. batch every 2 min. This means a production capacity for the plant of approximately 2,000 cu. yd. per 24-hr. day. A steamline has been installed at the concrete-mixing plant as a protective measure against cold weather. Though this project is in the South, infrequent cold spells can be expected during winter months, and under such conditions the water is heated and the aggregates are heated in the bins. The concrete will be at least 40 deg. F. in temperature when it reaches the forms. In the event of variation the temperature of the water is stepped up accordingly.

Construction of the concrete sections of Guntersville Dam is divided into three stages. Stage 1 calls for the erection of the navigation lock along the north bank of the Tennessee. This structure, designed by the War Department, will have a maximum lift of 45 ft. and a chamber 60 ft. wide and 360 ft. long. It will contain about 122,000 cu. yd. of concrete.

Delivery of concrete to the forms for the navigation lock began on September 21, 1936. For several weeks delivery to the cranes in the lock area

for placement was made by means of heavy-duty trucks, each carrying two 2-cu. yd. drop-bottom buckets. Individual chutes carried the discharge from the mixers to the concrete buckets in the truck alongside the plant.

By October 25 erection of the last flight of the belt-conveyor connecting the mixing plant and the navigation lock area was completed, and the concrete now leaves the plant on a 36-in. belt capable of handling 300 tons an hr. This fifth conveyor is 216 ft. long and the belt travels at 142 ft. per min. Like the others, this is a Barber-Greene unit with Hewitt belting.

The belt-conveyor discharges the concrete into a two-compartment timber stationary hopper located just inside the land wall of the lock. Air-operated rotary gates release it down metal chutes to the concrete buckets

The three electric vibrating screens which make final separation of sand.

below. Union, Blaw-Knox, and Dravo 2-cu. yd. buckets are used. The trucks that haul the concrete away are 18-ton Whites. Each carries two buckets to points within reach of the three Wiley Whirleys inside the lock area. The Whirleys are mounted on gantries and equipped with 95-ft. booms. Gooseneck extensions are used when needed. These cranes are equipment formerly used by the Authority in the construction of Wheeler Dam.

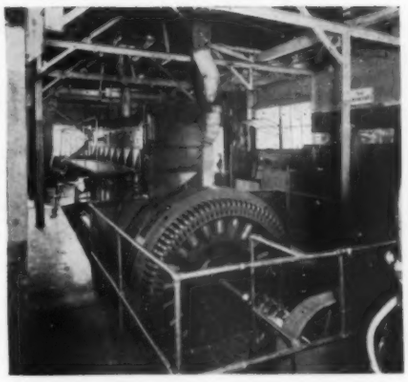
The concrete is placed in 10-ft. lifts, 72 hr. elapsing between successive placements in the same block. About four general mixtures are used, dependent upon whether the placement is to be made in the mass of the block, along the face, or at some other structurally important point. Another special mixture is used for grouting.

Communication between the various steps in order to coördinate the movement of material is achieved for the most part by telephone. The unloading dock, the radial stacker system, and the live-storage bins are all connected on one telephone system. The man at the live-storage bins, however, can switch to another telephone circuit connecting him with the turnhead operator in the head-house on the top of the concrete-mixing plant. The center of operations in the mixing plant is the office of the foreman on the batcher floor. The foreman can telephone from his station to the turnhead operator in the head-house above him, with the mixer operator below him, and with the man at the discharge end of the concrete conveyor at the edge of the lock. He can communicate with the concrete inspector also at the point of placement within the lock area.

Other forms of communication used are horn and light signals. A horn is located at the outer end of the stacker boom at the dead-storage plant whereby the man at the mast may signal to the operator of the crawler crane in the reclaiming operation. A two-way horn signal connects the man at the loading end of the cement bucket-elevator and the operator in the head-house on the top of the mixing plant. Switch and pilot-light equipment allows the man at the discharge end of the concrete belt-conveyor to signal the mixer operator.

Unlike the Pickwick Landing project, wherein the second stage operations shift to the other side of the river, the second cofferdam at Guntersville will tie in to the river wall of the lock and occupy the middle of the stream bed. Only about 60,000-cu. yd. of concrete will be placed in this spillway area.

Delivery of concrete to this second stage area will be by an extension of the present conveyor system. The hopper now inside the lock will be transferred to a point just within the second cofferdam. The present conveyor leading from the concrete-mixing plant will be tilted, and another flight added to span the lock at a



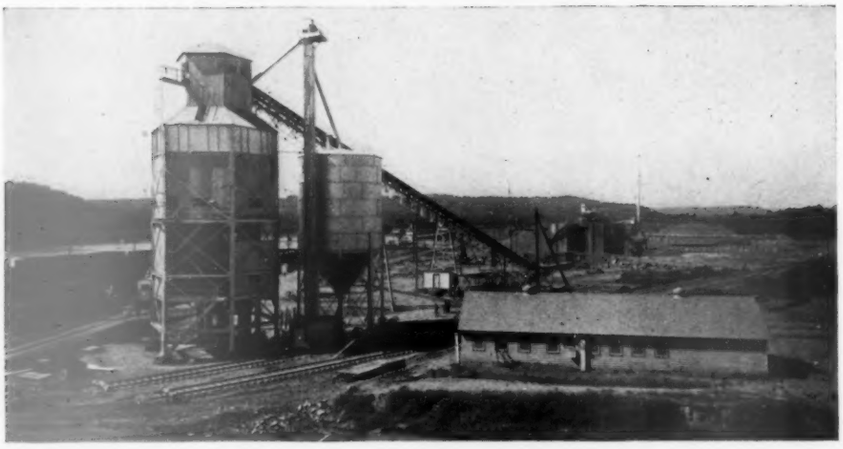
The 800-hp. Diesel engine and the direct-connected a.-c. generator which furnish power for dredge and floating screening plant.

height allowing at least 40 ft. clearance for navigation. From the discharge end of the last conveyor, the concrete will be chuted down to the hopper. From the hopper the handling operations will be identical with those now used in the lock area.

The third cofferdam, inclosing the power-house intake structures and part of the spillway, will complete the spanning of the river proper. The methods to be used for delivering concrete to this third area have not yet been definitely decided upon. One tentative plan is to erect another conveyor system extending along the bridge over the spillway section to connect that spanning the lock to the chute and hopper relocated just inside the third cofferdam. From that point the concrete would be trucked and rehandled by cranes as in the two previous stages. Consideration is also being given to the possibility of using trucks to move the concrete from the lock to the third area. Extensive studies are now under way to work out the most economical method possible.

Arthur E. Morgan is chairman and chief engineer of the Tennessee Valley

The 2-cu. yd. Whirley transferring aggregates from barges to shore hopper. Conveyor to radial stacker storage system in foreground.



The concrete-mixing plant operated by the T.V.A. at Guntersville Dam. Aggregate storage systems are in background.

Authority. C. A. Bock, assistant chief engineer, has direct charge of all T. V. A. engineering and construction. He is assisted by Theodore B. Parker, chief construction engineer, and Ross White, general construction superintendent. A. J. Ackerman is construction plant engineer on all the T.V.A. projects. In immediate charge of the Guntersville project are Verne Gongwer, project engineer, G. K. Leonard, construction engineer, and G. P. Jessup, construction superintendent.

Aggregates Production

By R. E. Burgess

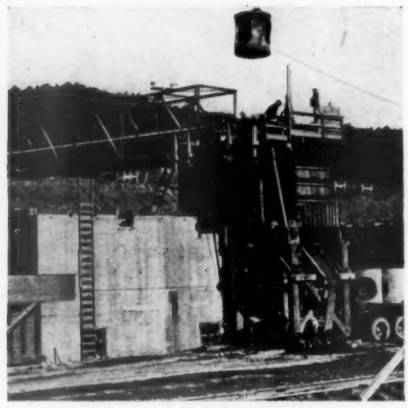
USING a floating sand-and-gravel plant in connection with its suction dredge, *Columbus*, the American Aggregates Corp. of Greenville, O., has been furnishing three sizes of gravel and two sizes of sand to the Tennessee Valley Authority at Guntersville Dam. The most important and interesting feature of this operation is the delivery of the two sizes of sand instead of the single size previously required on T. V. A. dam construction. The character of the available sand in this district makes it a difficult problem to secure a sharp division of sizes at the 30-mesh as required in the specification without considerable waste. Sand found in the Tennessee River in this area bulks heavily around the 30-mesh size, so that the split must be made at the most difficult point. This exacting job of sand classification, together with very efficient gravel screening is accomplished by use of a floating plant working with the dredge, *Columbus*.

The management and engineering staff of the American Aggregates Corp., together with certain coöperating T. V. A. officials, deserve the credit for planning and developing the present successful set-up. The fact that equipment to accomplish this job has been assembled on a hull 26 ft. wide by 135 ft. long with a vertical head above water-line of less than 35 ft. is evidence of skillful planning and design.

The dredge, *Columbus*, has been a wonderful factor in the steadiness and smoothness of the entire operation. Delays from this source have been negligible throughout the job. Built to handle a 16-in. line on channel work, she has been able to keep a capacity load on the plant and furnish the power for all the plant motors. The source of this power is the big 800-hp. Superior Diesel engine. Directly connected to the Diesel is the main alternating-current generator. The pump, a 15-in. Amsco heavy-duty dredge pump, is driven directly by a 400-hp. motor. The operating platform is located at the head end of the dredge and is elevated to give the operator an unobstructed view in all directions.

A 16-in. discharge line feeds the plant and is so arranged as to allow a maximum of movement by the dredge itself in the cut without the necessity of moving ahead with the plant and barges. Flexible couplings are used throughout the 300-ft. pontoon line, allowing the swinging and moving of the dredge without moving the screening barge. A 16-in. suction is used with a 50-ft. ladder and cone type manganese cutter. The cutter drive is mounted on the ladder and a 7-in. diameter shaft drives the cutter.

Cars of cement being transferred from railroad ferry at damsite.



Concrete being discharged from conveyor into 2-cu. yd. buckets on trucks.

Two hoists handle the dredge lines and are located immediately back of the operator. A 2-drum hoist handles the 35-ft. spuds on 1-in. lines, while a 3-drum hoist handles swing and hoist with $\frac{7}{8}$-in. lines.

Electrical power for the plant motors is carried by a submarine cable across the pontoon line and enters the switchboard in the cabin on the screening barge, from which it is distributed to the various units through conduit placed below deck. The dredge discharge line enters the plant at the upstream end and elevates at 30 deg. to enter the discharge box at the top of the plant.

Part of the water and sand is removed in the discharge box by means of vertical fence screens and passes directly to the sand flume. The load passes over the dewatering screens to two 4-ft. by 8-ft. triple-deck Simplicity vibrating screens. The oversize gravel is removed by a bar-grizzly located above the vibrators and passes to a waste well through the hull. The coarse gravel is screened out on the top deck and passes directly to the coarse-gravel conveyors. This product is graded from 4-in. to $1\frac{1}{2}$-in. The two smaller sizes of gravel pass on to 3-ft. by 10-ft. double-deck Symons screens made by the Nordberg Manufacturing Co., and are rescreened to secure better gradation. The intermediate gravel is graded from $1\frac{1}{2}$-in. to

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By ARNOLD KRUCKMAN

News and Views from the Capital

"ANY goods produced in any mine, quarry, mill, workshop, factory, or other place of employment . . . in which silica dust or other harmful dust hazard is present" shall not be shipped in interstate or foreign comerce, if H. R. 7971, a bill introduced by Representative Jerry O'Connell of Montana, becomes law.

Sec. 2 provides that the Secretary of Labor shall make the necessary investigations, and shall order the installation of safeguards to eliminate harmful dusts from any industrial occupation.

Investigations and hearings may be conducted by the Secretary of Labor upon petition, for instance, of a worker, or a labor union, or any welfare organization, if the bill becomes law.

The act would give the Secretary of Labor authority to send agents into any place where it is believed dust hazards exist. Refusal to permit inspection would be punishable by a fine of $500 and 6 months in jail. Violation of the prohibition against interstate or foreign shipment would be punishable by a fine of $1,000 and one year in jail. Goods shipped in violation of the law would be confiscated and, upon seizure, forfeited to the United States.

Every sensible observer of affairs in Washington at this time qualifies any opinion by the reservation that no one is capable of saying what may happen from day to day. Whoever said that confusion was worse confounded had lived under circumstances that were like those that obtain in the capital to-day. If events take a normal course, Congressman O'Connell's anti-silicosis bill will not have the slightest chance of being enacted during this session. It will be submerged in a flood of much more important measures that are striving for recognition. The bill is definitely unpopular with the Bureau of Mines and with the U. S. Public Health Service, both of which government agencies resent this proposed legislation as an attempt at trespass upon their preserves. And, of course, it would meet with vigorous opposition from all industries that are already overburdened with legislative policing by states, counties, municipalities and other political subdivisions.

Mr. O'Connell is an ambitious legislator from a state which has often debated silicosis problems in connection with its copper mines, and where such legislation is popular with labor voters. The bill will unquestionably make an excellent argument in next year's campaign. And Mr. O'Connell hopes to crowd Senator Wheeler out of his job in 1940.

The bill istelf bears every mark of being the product of the eager souls in the Department of Labor who obviously would like to achieve such a statute. Aside from a very sincere desire to do something they think is very much worth while, they make these gestures to build a record that is convincing to those whose influence supports them, and which help to make an imposing annual report. And there is always the chance that one of these shots in the blue may hit something.

It was expected that the Senate would resist the wage-hours bill. It was no secret that the A. F. of L. would be completely happy if the whole thing were shelved. The A. F. of L. now regards much of the "new deal" labor legislation as a sort of extension of the C. I. O. The A. F. of L. did not realize that situation until the effects began to become apparent. Now it feels that the tendency of the wage-hours legislation is to wipe out organizations like the A. F. of L., and it very frankly declares that the wage schedules will inevitably raise the cost of living and the working-schedules will reduce weekly earning power. There really has been no more sincere and solid lobby against the wage-hours legislation than the drive that was waged by the A. F. of L.

Alongside the A. F. of L. marched the members of the Congress from the South. The South, regardless of its Democratic orthodoxy, is opposed to this "new deal" labor legislation. It is easy to understand its position when you reflect upon this story. It is vouched for by a principal of the industrial organization which made the test. This organization, which has plants in all sections of the United States, has its headquarters in the area around the Great Lakes. Not so many years ago it opened a plant in the South. Having heard much about the superior personal qualities of the Anglo-Saxon workers below the Mason and Dixon line the organization used southern labor. After a reasonable trial it was found that for many reasons this homogeneous human energy was not geared up to the speed of northern labor. Men and women, full of pep and vigor, were brought down from the Great Lakes region. But after a year's carefully recorded test it was discovered that the northern workers slowed down, and that at least 33⅓ per cent. more workmen were needed to do the job. To make sure of the facts another group was imported and tried. The result was practically the same; and in the meantime the original immigrants from the Great Lakes had slowed down even more. It was proved that it took a considerably larger number of workers to do a given job in the South than it did to do the same job in the North. Colored workers were not involved in these tests. And they are naturally a very large part of the labor problem in legislation for southern workers.

IT WAS expected that the Senate would shelve the wage-hours bill by recommitting it to the committee. Farm organizations had come out doggedly in opposition. Industry and business, large and small, everywhere, had fought it earnestly. There was a universal fear of the powers bestowed by Tom Corcoran and Ben Cohen upon the board of five. Even the amended bill hastily filed by Senator Black, which eliminated many vague and indeterminate features, and which fixed the maximum work-week at 40 hr. and the minimum wage scale at 40c. per hr., was regarded as dangerous. It provided that the bill should not apply to persons employed in a retail capacity, and it exempted farm workers, seamen, fishermen, and railroad workers. It provided that industry suffering by reason of foreign competition should be given the help of a higher tariff wall. And it was made mandatory that the board should appoint an advisory committee composed

equally of representatives of labor, industry and consumers to investigate and report upon all problems that might come before the board. And as the bill was finally passed by the Senate, goods made by children under 16, in some cases under 18, may not be shipped in interstate commerce, and may not be shipped into states which have laws prohibiting child labor. The child-labor clause as adopted was the Wheeler-Johnson bill.

But the essential, sweeping police powers of the board of five over labor practices were not altered in the bill passed by the Senate. Under the bill as passed the board has to all intents and purposes power over intrastate as well as interstate industry; has the right to inspect books, workers, factories, whenever it pleases; may label goods fair or unfair, thus literally putting a government boycott on goods it rules as produced by unfair practices; may, without court order, prohibit interstate shipment of interdicted goods, and may cause the imposition of fines and jail sentences upon those adjudged as violating the law. It strengthens immeasurably the powers of the National Labor Relations Board and expands and stiffens the powers of the Federal Trade Commission. For instance, the National Labor Relations Board may apply directly to the Labor Standards Board to punish offenders, and the Federal Trade Commission may further prosecute those whom the Labor Standards Board has found guilty of unfair labor practices.

ALWAYS remembering that under existing conditions life in the Capital is about as rational as life was for Alice in Wonderland, it is expected the wage-hours bill will eventually go through the House without much opposition. The stampede in the Senate has set the pace, and the members of the House, without a single exception, are obliged to run for reëlection next year. The Administration pressure having, unexpectedly, been powerfully effective upon the Senate, there is very little doubt that it will be what a now somewhat ancient slang used to call a "push-over" in the House. The House is restive, uneasy, nervous. It is wary of mistakes. Although during the long court fight it had nothing to do, and it did nothing in the comfortable atmosphere of air-conditioned offices and air-conditioned assembly halls, and lived in air-conditioned apartments or homes that are thoughtfully provided by the real-estate oligarchy that rules Washington, the members of the Congress have convinced themselves that their arduous labors in the sodden heat of the swampy Capital have worn them out, and that they must get away as fast as possible. So it is very probable the Senate bill will be adopted after a little debate agitated mainly by those who wish to impose a wage-scale of 70c. per hr., attributed to Mr. Roosevelt; and a work-week of 35 hr., also credited to Mr. Roosevelt. Maury Maverick (Tex.) would like to have the bill apply to all retail businesses employing one or more persons.

It is also very probable that this Senate stampede for the wage-hours bill will give momentum to the Administration's drive for the passage of the Wagner housing bill; the bill to plug tax leaks; more sections of the government-reorganization bill; and possibly may help those who are in revolt against the emasculated court bill. It is very likely that this change in favor of the Administration may facilitate the passage of a number of Corcoran and Cohen bills that have hitherto been considered lost in the shuffle. In the hurry to get away the Congress may enact legislation that would raise their collective hairs in horror under calmer circumstances. It is probable that laws may be placed upon the statute books that will amaze the members of the Congress themselves, when they become aware of them. That is the psychology of these sessions that end in a feverish rush to be gone.

The National Labor Relations Board, which increasingly seems to emerge as the champion of the worker, recently announced that during the two years of its existence it has held 191 elections with 104,671 workers voting, an average of 548 workers to each election. During June the daily average of workers voting on the question of a bargaining agency averaged 1,800. New York held the greatest number of government-supervised elections, Pennsylvania and California being next. Then, in order, came New Jersey, Ohio, Massachusetts, Indiana, Illinois, Wisconsin, Missouri, Minnesota, Connecticut, Vermont, Maryland, Alabama, Texas, North Dakota, Oregon, Utah, and Oklahoma. Among the industrial organizations listed there was only one affiliated with the pit-and-quarry industries. An election was held at the plant of the National Cement Co., Birmingham, Ala., in which the C. I. O. union won over the A. F. of L.

The various proceedings of the National Labor Relations Board also make emphatically clear that it frowns upon company unions. It has developed what might be called a series of tests by which it determines whether the employer dominates the union. Few company unions, no matter how altruistic, seem to survive the test. The thing the board insists upon is that the union must have a "free voice". In the course of its hearings the board investigates to discover whether or not the labor practices of a concern are unfair. If it finds conditions that may warrant criminal action it reports its findings to the Department of Justice. It then becomes the function of the Department of Justice to determine what to do.

Some time ago it was reported that members of the Department of Justice brought to light an antiquated law, passed in the days immediately after the Civil War, to prevent interference with votes by Negroes, known as Sec. 51, Title 18 of the U. S. code. It forbids conspiracy to interfere with the performance of a citizen's constitutional rights. It has been expected that radical labor sympathizers may attempt to use this almost forgotten law in connection with testimony the National Labor Relations Board may have elicited in some of its recent hearings in the proceedings against the more conspicuous corporations.

THERE are indications that the Robinson-Patman Act complaint by the Federal Trade Commission against the U. S. Tile Quarry Co., may be abandoned. It was reported in PIT AND QUARRY for June that Attorney Newell W. Ellison felt that the government had not made a case. The Federal Trade Commission, which charged price discriminations by means of functional discounts — meaning broadly a system of discounts that have become part of the fixed custom of an industry—closed its presentation of testimony on May 3. Since that date it has repeatedly postponed the hearings at which the U. S. Tile Quarry Co. might present its testimony. At first it was reported that the examiner in charge was otherwise engaged. The attorney in charge of the case for the Federal Trade Commission now acknowledges that the investigation division of the Federal Trade Commission is making further examination of the facts.

The commission recently dismissed the Robinson-Patman cases against Montgomery, Ward & Co., Bird & Son, Inc., Bird Floor Covering Sales Corp., and the Kraft-Phenix Cheese Co. It found that the Kraft-Phenix discount system had no effect upon retail prices since it is not used "to unfairly deprive competitors of business," neither is it "promotive of monopoly". The case of Montgomery, Ward & Co., and the Bird companies, was dismissed because the discrimination was found proper because the Birds could legitimately sell at a lower cost to Mont-

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BY W. E. TRAUFFER

Left: The Rolesville, N. C., plant of the Raleigh Granite Co. The derrick was formerly used to handle stone skips. Below: The quarry, with crusher and conveyor in foreground.

Truck-Trailer Units Save for This Carolina Granite Quarry

THE writer has long been of the opinion that the success of a company in its field and the soundness of its operating policies may be judged to a large extent from the measures taken to insure the safety and well-being of its employees. The Raleigh Granite Co. of Raleigh, N. C., offers an excellent argument for making such a supposition. This company has in recent years developed many operating methods which have resulted in substantial economies, keeps complete records of costs and efficiencies and makes time studies of various operating units. Bristol time recorders keep records of time lost at each plant due to breakdowns, weather conditions, etc. Safety measures are not only laid down for its employees but are also observed and rigidly enforced.

The Raleigh Granite Co. was formed in 1916 with a plant at Greystone, N. C. The Neverson Quarry, which is no longer operated, was next acquired and the Rockton plant was built. In 1922 the Rolesville plant near Wake Forest was built and in 1930 the Woodleaf plant was purchased, as was also the Guilquarry plant in 1932. In 1928 this company joined the South Carolina Granite Co., with a plant at Blairs, S. C., to form the Southern Agreggates Corp., of which both are subsidiaries. In 1936 a small quarry was opened at Reedsville in which a new Nordberg-Symons screen was installed. During the past three years all the revolving screens at these plants have been replaced with the vibrating type.

Of these plants the operation at Rolesville probably is the best example of the company's methods. Here stone was at one time loaded by hand by convicts into cars, which were then hauled up an incline to the plant. In 1934 several 5-ton trucks were put in operation for this purpose, a primary crusher was placed at quarry level and a 2-cu. yd. electric shovel was placed in the quarry. A belt-conveyor replaced the incline. In 1936 a vibrating screen replaced the rotary screens. In March of that year the company replaced the trucks with two 8-cu. yd. truck-trailer units and in July, 1936, added a third unit of 10-cu. yd. capacity.

The Rolesville deposit is a massive formation of granite typical of this region. While only a single quarry is actually operated, a 150-ft. barrier of rock has been left untouched. This divides the quarry into two quarries and makes it possible for the shovel to load stone from one side while drilling and blasting are carried on at the other side. Ordinarily one change-over is made daily.

One section has a 210-ft. face and the other a 320-ft. face and both faces are about 60-ft. high. Sanderson "Cyclone" electric well drills bore the 5¾-in. blast holes, which are loaded with 5½-in. by 24-in. cartridges of DuPont Nitramon B. Usually from 13 to 16 holes in a single row are detonated at one time. The holes are spaced 15-ft. apart with a 25-ft. burden and are drilled 5-ft. below the quarry-floor level. They are loaded solid with from 15 to 20 ft. of tamping. Each hole has a Nitramon primer at the top. Cordeau - Bickford double - countered fuse is used in the hole and plain Cordeau is used above. The charge is detonated by electric caps fired by battery. Very good breakage and clean vertical faces are obtained.

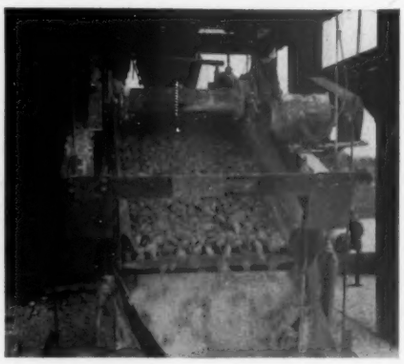
Wet secondary drilling on quarry face. Note hard hats worn by drillers.

Blockholing is done with Ingersoll-Rand S 68 Jackhammers. Six of these are wet-type drills and the other two are dry drills converted for wet operation. This conversion is made by means of an old piece of conveyor belting about 4-in by 5-in. in size with a 1¾-in. hole in the center for the drill steel. This piece of belting is riveted to the end of the ½-in. water hose. An increase of at least 10 per cent. in drilling speed has resulted and dust is entirely eliminated. This is important as the rock contains about 20 per cent. free silica. Block holes are drilled to an average depth of 3 ft. and one-third of a stick of explosive is placed in each hole. A 36-in. fuse and two 18-in. signal caps are used and these are lighted with red-hot irons.

The Bucyrus-Erie 50B electric shovel in the quarry has a 2-cu. yd. dipper which has an original feature. A section of the top of the dipper lid between the hinge brackets has been cut off, leaving an opening through which the shovel operator can see how well the dipper is loaded. In this way a full load is assured before the loading cycle is made. This feature alone has resulted in a considerable increase in the loading capacity of the shovel. The dippers on all the company's shovels have now been arranged in this manner.

Each of the three truck-trailer units which haul stone from the quarry face to the primary crusher has a Ford V8 tractor. These machines are 1935 Model Fords with 131-in. wheelbase and are equipped with a 6.6 to 1 ratio rear-axle drive. Each is equipped with auxiliary springs and has dual rear tires. Each tractor is equipped with a governor and special cooling equipment. Each of the two Easton semi-trailers with 8-cu. yd. bodies is supported on a fifth wheel mounted 12-in. in front of the Ford rear axle, giving a wheelbase of 138-in. between the Ford rear axle and the trailer axle. The trailer is also equipped with dual wheels. The 10-cu. yd. Easton trailer is similarly mounted. All the trailers have Easton Phoenix side-dump bodies. These trailers are so designed that no sub-frame is needed.

According to H. M. Shaw, treasurer of the company, these three-semi-trailer units in the period from June through October in 1936 hauled 7,817 loads totaling 67,050 tons of stone.



The triple-deck vibrating screen which does all sizing.

In this period these units were operated 1,150 mi. with an average length of haul of 390 ft. Each of the three trucks averaged one trip every 8.8 min. for the 378 hr. the plant operated. The maximum number of loads handled in any one hour during this period was 35, or 11.8 per truck, with an elapsed time of 5.1 min. per trip.

During this period the trucks consumed 1,045 gal. of gasoline which, at 16 c. per gal., cost $167.20. They used 106 qt. of oil which, at 20 c., came to $21.20. Truck repairs, which included those made to carburetor, generator and battery, amounted to $35.00. No trouble was experienced

Shovel dipper in loading position. Opening allows operator to see extent of loading.

with the semi-trailers or with any of the tires. Firestone tires are used exclusively.

The stone is dumped from these trailers into the primary crusher by means of an Easton patented dumper operated by a Curtis air hoist. The 48-in. by 60-in. Traylor jaw crusher discharges its product on the 42-in. belt-conveyor which operates on 235-ft. centers and carries the stone out of the quarry to the plant. Secondary reduction is done by a 16-in. Allis-Chalmers gyratory crusher, whose product is discharged on a grizzly. Stone retained on the grizzly is further reduced by a 4-ft. Symons cone crusher, the product of which, together with the stone passing through the grizzly, is discharged in a 30-in. by 60-ft. belt-bucket elevator. All the sizing is done on an Allis-Chalmers 4-ft. by 12-ft. triple-deck vibrating screen. With this equipment as much as 200 tons of sized stone has been produced in an hour and the average over a long period is 150 tons per hr. These figures do not include screenings, which form about 20 per cent. of the total production and are usually wasted.

This company has for many years been taking all possible precautions for the safety of its employees and has formulated a complete set of safety rules. Since May, 1935, the company has been a member of the National

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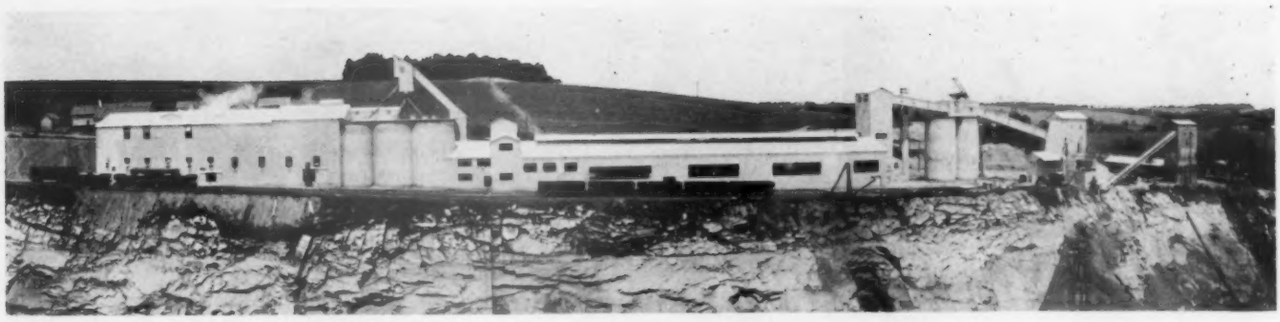
The three trucks with their semi-trailers lined up for loading at the quarry face.



The new rotary-kiln lime plant of H. E. Millard near Annville, Pa. From left to right are the packing and loading building, lime silos, kiln building, stack, stone silos, dry crushing plant, wet stone plant. Also at right is the rebuilt secondary crushing plant and the incline from the main quarry.

H. E. Millard Builds World's Most Modern Rotary-Kiln Lime Plant

By W. B. TRAUFFER

THERE are in industry few large concerns which are owned 100 per cent. by one individual. Usually, for various reasons, when a small business enterprise expands, it is found necessary or advisable to divide ownership among a number of individuals. The case of the Millard properties is an exception. The late J. B. Millard in 1880 started a small flux stone business which expanded considerably up to 1917, when he sold his entire interest in the business to his son, the present sole owner, H. E. Millard.

Through periods of prosperity and of depression the ownership of this business has been retained in its entirety by H. E. Millard. Under his management the already extensive enterprises founded by his father were expanded and have become one of the most extensive nonmetallic-minerals producing businesses.

Early in 1936 Mr. Millard decided to expand his production of lime further and began the construction of a new rotary-kiln lime plant which has made obsolete previous conceptions of lime-production methods. This plant incorporates for the first time in the history of the lime industry many types of equipment and operating methods which have long been used in cement production. No expense or effort was spared in the attempt to build a plant which seems to be the ultimate in economical production of high-grade lime. This plant went into operation May 15, 1937.

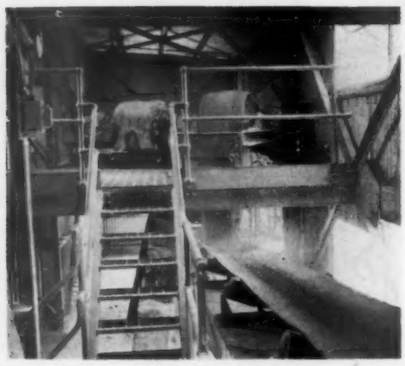
The plant was built on property alongside what is known as the Annville quarries. It is actually about 2 mi. west of Annville. This quarry for many years supplied the stone for two crushed-stone plants, one of which is a dry-screening operation and the other a wet-screening and washing operation. Stone for the new rotary kiln is obtained from either plant. This quarry and the two crushing plants are more completely described later in this article.

Any of the six sizes of stone produced by the dry plant can be discharged on the first unit of the lime plant, a fully-inclosed 20-in. belt-conveyor, from which it can be discharged into either of the two 2,000-ton stone storage silos or on another 20-in. belt-conveyor feeding the 250-ton kiln-feed bin. Stone is reclaimed from the silos through six F. L. Smidth gates under each silo on a 20-in. tunnel belt-conveyor. These gates are designed for accurate and steady feed and they rarely bridge or block. They operate on the angle-of-rest principle and start to feed as soon as the belt-conveyor is in motion. A slide gate above each of these gates can shut it off entirely. This type of gate is used under all the silos in this plant.

The tunnel belt-conveyor discharges the stone into a hopper which feeds the 40-cu. ft. bucket of a Link-Belt counterbalanced skip hoist. Stone is withdrawn from this hopper into the skip bucket by means of a balanced-chute arrangement, which is opened by the bucket as it moves into position and remains open until the bucket is full and starts upward. The hoist may be operated automatically or manually and in the latter case its speed can be adjusted to the rate of feed desired. This bucket can discharge the stone back into either of the stone silos but usually drops it on the belt-conveyor running to the kiln-feed bin. This concrete hopper can also be loaded from trucks which discharge from ground level in order to feed stone to the lime plant from the stone plant bins or from stock-piles should this on occasion be necessary.

H. E. Millard, whose vision and foresight made possible this outstanding new plant.

Another view of plant with stone skip and silos in foreground. At extreme right in background is the coal-storage silo.



Motor-reducer drive of conveyor from stone plant. Lower conveyor goes to kiln feed bin.

The 250-ton steel kiln-feed bin discharges the stone to a Smidth table feeder which in turn passes it into the kiln through a feed pipe of unusual design. The F. L. Smidth rotary kiln is 290 ft. in length. For 187 ft. of its length from the feed end it is 6 ft. 8 in. in outside diameter and in a 10-ft. section it tapers up to 8 ft. 2 in., which is the outside diameter of the remaining 93 feet of the kiln's length. A dike at the feed opening and flights in the

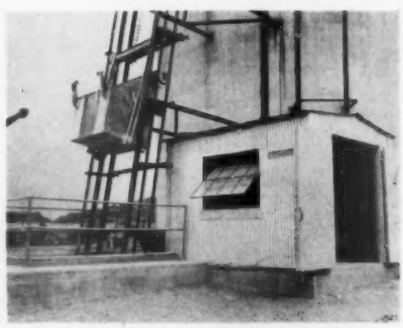
The table feeder which supplies stone to kiln through spout at right.

first 10 ft. of kiln shell keep the dry rock from spilling out the end of the kiln. The next 56 ft. of the kiln is divided into quadrants by radial partitions. This exposes a larger surface area of the material to the heat than otherwise would be the case and adds the equivalent of 45 ft. of kiln length. Attached to the discharge end of the kiln is a single row of ten 30-in. diameter Unax coolers which extend 10 ft. back from the end of the kiln shell. These coolers are equipped with chains to facilitate heat transfer. Secondary air for the kiln is preheated to about 800 deg. F. in passing through these coolers.

The kiln is lined throughout with Harbison-Walker brick. Beginning at the discharge end there is 8 ft. of H-W Special 40-per cent. alumina, then 40 ft. of Alusite 70-per cent. alumina, and 20 ft. of Anchor Brand 60-per cent. alumina. From this point to the heat exchanger H-W Special bricks are used and from the exchanger to the end of the kiln Tyrone wear-resisting low-temperature blocks are used. The 6-ft. 8-in. section of the kiln has 2½ in. of Johns-Manville Superex insulation next the shell and ½ in. of Superex high-temperature cement between the insulation and the brick.

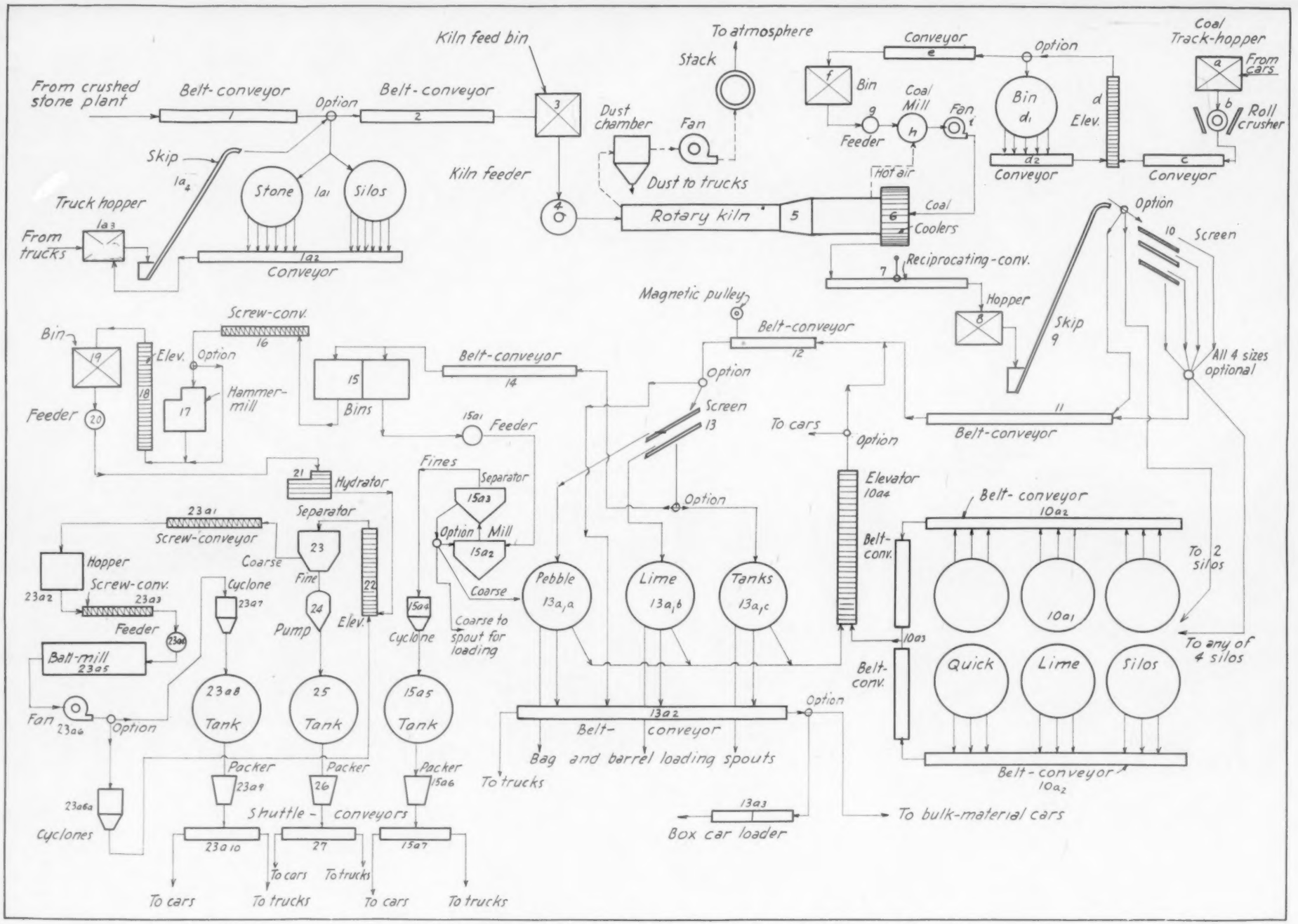
The kiln is identical in design and construction with the F. L. Smidth kilns installed in recent years in numerous cement plants which have been described in PIT AND QUARRY[1]. This kiln has five tires, of which four are floating and the thrust tire, No. 3, is riveted to the kiln shell. Each tire is supported on two cast-steel rollers with water- and oil-cooled bearings. At the No. 3 tire a thrust-roller assembly takes the entire end thrust of the kiln.

[1] [PIT AND QUARRY, Oct., 1936, pp. 36-48-ED.]



Stone skip bucket with truck hopper and hoist building below.

The 290-ft. rotary kiln with cell-type coolers in background. Protruding bolts at upper right mark beginning of heat-transfer section.



Flow-sheet of the new H. E. Millard rotary-kiln lime plant near Annville, Pa.

FLOW SHEET AND TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF NEW LIME PLANT OF H. E. MILLARD, NEAR ANNVILLE, PA.—PART I.

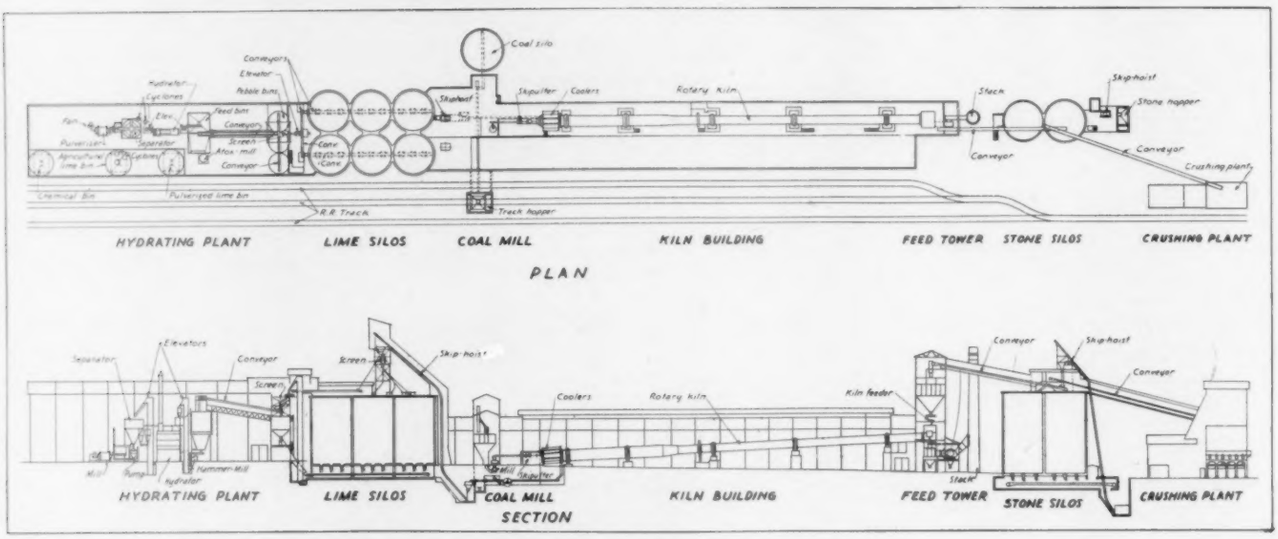
(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key No.	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Stone Storage and Handling		(From dry crushed-stone plant)				
	1	Conveyor (To 2 or $1a_1$) (From 1 or $1a_3$)	Link-Belt	Belt, 20-in. by 24-ft.	7½-hp., 1,750-r.p.m. G.E. motor	Falk motor-reducer
	$1a_1$	Silos (2)	M. A. Long	2,000-ton concrete, 30-ft. by 65-ft.		
		Gates (6)	F. L. Smidth	Arc-type		
	$1a_2$	Conveyor (From $1a_2$ or trucks)	Link-Belt	Belt, 20-in. by 92-ft.	5-hp., 1,750-r.p.m. G.E.	Falk motor-reducer
	$1a_3$	Truck hopper		Concrete		
	$1a_4$	Skip hoist (To 2 or $1a_1$)	Link-Belt	Type RS, 40-cu. ft. automatic, counter-balanced	20-hp., 1,200-r.p.m. motor	
		(From 1 or $1a_4$)				
	2	Conveyor	Link-Belt	Belt, 20-in. by 106-ft.	5-hp., 1,750-r.p.m. G.E.	Falk motor-reducer
	3	Bin		Steel, 250-ton	5/2- { 1200/600 } syn.	
	4	Feeder	F. L. Smidth	Table	hp., { 900/450 } sp.	Falk speed-reducer
Calcining and Cooling		(Cement from 4, coal from i)				Falk speed-reducer
	5	Kiln (Lime to 6, dust to $5a_1$)	F. L. Smidth	Rotary, 6-ft. 8-in. by 8-ft. 2-in. by 290-ft.	50/19-hp., { 1200/600 } { 900/450 } syn. speed motor and auxiliary gasoline engine	
	6	Cooler	F. L. Smidth	Unax, 10-cell		
Pebble-Lime Handling and Screening	7	Conveyor	F. L. Smidth	Skipulter	15-hp., 860-r.p.m. induction motor	Falk speed-reducer
	8	Hopper		Steel		
	9	Skip hoist (To 10, 11 or $10a_1$)	Link-Belt	Type RS1, ½-ton balanced, automatic	7½-hp., 1,200-r.p.m. syn. speed motor	
	10	Screen (Any or all sizes to 11 or $10a_1$) (From 9 or 10)	Link-Belt	Vibrating, 3-deck, 3-ft. by 6-ft., fully-inclosed	2-hp., 1,750-r.p.m. inclosed, fan-cooled motor	V-belt
	11	Conveyor (From 11 or $10a_4$)	Link-Belt	Belt, 20-in. by 56-ft.	3-hp., 1,800-r.p.m. motor	Falk speed-reducer
	12	Conveyor Magnetic pulley (To 13 or $13a_2$)	Link-Belt Dings	Belt, 20-in. by 6-ft. 24-in. by 24-in.	3-hp., 1,725-r.p.m.	
	13	Screen (Fine to 14 or $13a_1c$, coarse to $13a_1$ and $13a_1b$)	Link-Belt	Vibrating, 2-deck, 4-ft. by 8-ft., fully-inclosed	5-hp., 1,200-r.p.m. motor	Gilmer V-belt
Hydrator-Feed Storage, Preparation and Feeding	14	Conveyor	Link-Belt	Belt, 20-in. by 65-ft.	5-hp., 1,800-r.p.m.	Falk speed-reducer
	15	Bins (2) (To 16 and $15a_1$)		Steel, 100-ton		
	16	Conveyor (To 17 or 18)	Stephens-Adamson	Screw, 10-in. by 12-ft.	5-hp., 1,720-r.p.m. motor	D. O. James speed-reducer
	17	Hammer-mill (From 16 or 17)	Jeffrey	Type A_2, 36-in. by 24-in., ball-bearing	50-hp., 1,200 r.p.m. motor	Direct
	18	Elevator	Link-Belt	Chain-bucket, 58-ft., 20 tons per hr.	7½-hp., 1,800-r.p.m. motor	Falk speed-reducer
	19	Hopper		Surge, ½-ton		
	20	Feeder	Hardinge	Volumetric, No. 101	½-hp., Master	Motor-reducer
Hydration and Hydrate Separation	21	Hydrator (From 21 or $23a_6a$)	Kritzer	12-ton, continuous	20-hp., 1,800-r.p.m. motor	Falk speed-reducer
	22	Elevator	Link-Belt	Bucket, 47-ft., 30 tons	7½-hp., 1,800-r.p.m.	Falk speed-reducer
	23	Separator (Fine to 24, coarse to $23a_1$)	Gayco	Model 34, 14-ft.	25-hp., 1,200 r.p.m. motor	Gates Vulco-rope
Fine-Hydrate Transport, Packing and Loading	24	Pump	Kennedy-Van Saun	Pneumatic, 1,900-lb. capacity		
	25	Tank		Steel, 50-ton		
	26	Packer	Valve Bag	3-tube	7½-hp., 1,200-r.p.m. motor	
	27	Conveyor (To cars or trucks)	Link-Belt	Belt, 24-in. by 16-ft., reversible shuttle	2-hp., 1,800-r.p.m. motor	Falk speed-reducer
Quicklime Storage		(From 9 or 10)				
	$10a_1$	Silos (6)	M. A. Long	Concrete, 1,000-ton, 30-ft. by 70-ft.		
		Gates (18)	F. L. Smidth	Arc-type		
	$10a_2$	Conveyors (2)	Link-Belt	Belt, 20-in. by 90-ft.	5-hp., 1,800-r.p.m. motor	Falk speed-reducer
	$10a_3$	Conveyors (2) (From $10a_3$ and $13a_1$)	Link-Belt	Belt, 20-in. by 15-ft., inclined	2-hp., 1,800-r.p.m. motor	Falk speed-reducer
	$10a_4$	Elevator (To 12 or direct to cars)	Link-Belt	Bucket, 79-ft., 100-tons per hr.	10-hp., 1,800 r.p.m. motor	Falk speed-reducer

FLOW SHEET AND TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF NEW LIME PLANT OF H. E. MILLARD, NEAR ANNVILLE, PA.—PART II.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key No.	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Pebble-Lime Storage, Packing and Loading	13a1	(All sizes from 13)				
		Tanks (3—a, b and c) (To 10a4, 13a2, or to bag- and barrel-loading spouts) (From 12 or 13a1)		Steel, 35-ton		
	13a2	Conveyor (To trucks, cars, or 13a3)	Link-Belt	Shuttle belt, 20-in. by 50-ft.	5-hp., 1,800-r.p.m. motor	Falk speed-reducer
	13a3	Loader (To box-cars)	Manierre	Slow-speed, sectional-belt	7½-hp., 1,150-r.p.m. motor	
Quicklime Pulverizing, Packing and Loading		(From 15)				
	15a1	Feeder (From 15a1 and/or 15a3)	F. L. Smidth		¾/1-hp., 400/1,200-r.p.m., d.c. motor	Cleveland worm-gear speed-reducer
	15a2	Pulverizer	F. L. Smidth	Atox	60-hp., 1,160-r.p.m. motor	V-belt
	15a3	Separator	F. L. Smidth		7½-hp., 575/1,725-r.p.m., d.c. motor	V-belt
		Fan (Coarse to 15a2 or loading spout, fines to 15a4)	F. L. Smidth		25-hp., 1,160-r.p.m. motor	V-belt
	15a4	Cyclone	Kennedy-Van Saun	6-ft.		
	15a5	Tank		Steel, 100-ton		
	15a6	Packer	Valve Bag	3-tube	7½-hp., 1,200-r.p.m.	
	15a7	Conveyor (To cars or trucks)	Link-Belt	Belt, 24-in. by 16-ft., reversible shuttle	2-hp., 1,800-r.p.m. motor	Falk speed-reducer
Coarse Hydrate Grinding		(Coarse from 23)				
	23a1	Conveyor	Link-Belt	Screw, 9-in. by 10-ft.	1½-hp., 1,800-r.p.m. motor	Link-Belt P.I.V. variable-speed reducer
	23a2	Hopper		Surge, 5-ton		
	23a3	Conveyor	Link-Belt	Screw, 9-in. by 10-ft.	1½-hp., 1,800-r.p.m. motor	Link-Belt P.I.V. variable-speed reducer
	23a4	Feeder	Kennedy-Van Saun		1½-hp., 1,740-r.p.m. motor	
	23a5	Tube-mill	Kennedy-Van Saun	Air-swept, 5-ft. by 8-ft.	75-hp., 1,155-r.p.m. motor	Philadelphia speed-reducer
	23a6	Fan (To 23a7 or 23a6a)	Kennedy-Van Saun	No. 606 fan	15-hp.	Direct
Ground-Hydrate Packing and Loading	23a7	Cyclones (4)	Kennedy-Van Saun	5-ft.		
	23a8	Tank		Steel, 50-ton		
	23a9	Packer	Valve Bag	3-tube	7½-hp., 1,200-r.p.m.	
	23a10	Conveyor (To cars or trucks)	Link-Belt	Belt, 24-in. by 16-ft., reversible shuttle	2-hp., 1,800-r.p.m. motor	Falk speed-reducer
Ground-Hydrate Separation	23a6a	Cyclones (2) (To 22)	Kennedy-Van Saun	5-ft.		
Coal Handling, Crushing and Feeding to Kiln		(From cars)				
	a	Track hopper		10-ton		
	b	Crusher	Jeffrey	Single-roll, 24-in. by 24-in.	25-hp., 860-r.p.m. motor	Flat belt
	c	Conveyor (From c or d_2)	Link-Belt	Belt, 20-in. by 86-ft.	5-hp., 1,750-r.p.m. motor	Falk motor-reducer
	d	Elevator (To e or d_1)	Link-Belt	Bucket, 65-ft., 75 tons per hr.	7½-hp., 1,750-r.p.m. motor	Falk motor-reducer and chain
	e	Conveyor	Link-Belt	Belt, 20-in. by 60-ft., reversible shuttle	5-hp., 1,750-r.p.m. motor	Falk motor-reducer
	f	Bin		Steel, 25-ton		
	g	Feeder	F. L. Smidth		¾/1-hp., 400/1,200-r.p.m., d.c. motor	Cleveland worm-gear speed-reducer
	h	Pulverizer	F. L. Smidth	Atox, Size 8	30-hp., 1,160-r.p.m.	Dodge V-belt
	i	Fan (To 5) (From d)	F. L. Smidth		20-hp., 1,760-r.p.m. motor	Dodge V-belt
Coal Storage	d_1	Silo	M. A. Long	Concrete, 500-ton, 30-ft. by 40-ft.		
		Gates (5)	F. L. Smidth	Arc-type		
	d_2	Conveyor (To d)	Link-Belt	Belt, 20-in. by 77-ft.	5-hp., 1750-r.p.m.	Falk motor-reducer
Kiln Draft and Dust Recovery		(From 5)				
	5a1	Dust chamber				
	5a2	Fan	Buffalo	Type SL, Size 24	15-hp., 1,160-r.p.m. motor	Link-Belt silent chain
	5a8	Stack	M. A. Long	Concrete, 6-ft. interior diam. by 100-ft.		



Plan and cross-section of new H. E. Millard rotary-kiln lime plant.

The rated capacity of this kiln is from 125 tons to 150 tons in 24 hr. The best results from the standpoint of fuel economy and quality of product are obtained with comparatively low temperatures in the calcining zone and with stack-gas temperatures of from 700 to 750 deg. F. The use of a gas analyzer makes it possible to operate within very close limits. A louvre damper operated from the kiln panel controls the draft, which is supplied by a Buffalo No. 24 Type SL fan. A dust chamber precipitates dust which is hauled away in trucks for use on the Millard farms. The gases pass to the atmosphere through a 100-ft. concrete stack 6 ft. in diameter and lined for its full height.

The F. L. Smidth centralized system of kiln control is used. All controls for the kiln and its appurtenant equipment are conveniently arranged on a board of cubicle design on the kiln-firing floor. This system is comprised of a kiln speed-recorder, CO_2 and CO $+H_2$ percentage indicators and recorders, a Leeds & Northrup Micromax pyrometer for recording dust-chamber temperatures, a Foxboro pyrometer for coal-mill inlet and outlet temperatures, three Hays draft gages for the coal mill and both ends of the kiln, ammeters, voltmeters, controls,

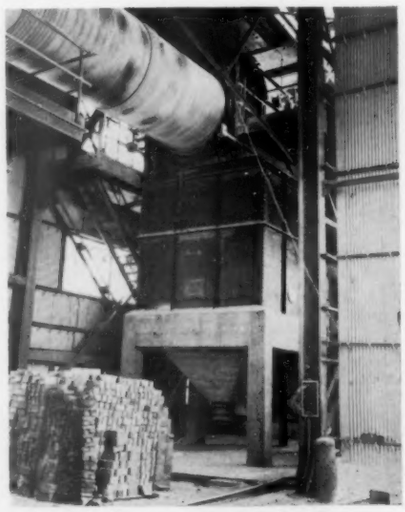
The cubicle-type control board with indicating and recording instruments.

The gas analyzer which records CO_2 and $CO + H_2$ percentages.

switches, etc., all properly interlocked with many safety features. There is also a telephone connection to the feed end of the kiln and a telephone booth for outside calls.

The speed of the kiln feeder and the kiln are synchronized through the use of 4-speed motors on both units controlled from the same switch. Variation in the relative rate of feed is obtained by adjusting the scraper setting on the feeder. The kiln is driven by a 50/19-h.p. $\left\{\begin{matrix}1{,}200/600\\900/450\end{matrix}\right\}$ syn. speed motor with 150-per cent. starting torque through a Falk speed-reducer. The master gear is attached to the kiln shell by means of spring drive-plates. The table feeder is driven by a 5/2-hp. motor with similar characteristics. A White G 47x gasoline engine serves as an auxiliary power unit for the kiln and can quickly be connected up by chain.

The calcined lime is discharged from the Unax cooler at a temperature of about 400 deg. F. on an F. L. Smidth Skipulter which drops it into a hopper. The lime is discharged automatically from this hopper into the ½-ton bucket of a Link-Belt skip hoist. This is similar in design to the stone skip and also operates automatically. The top of this skip extending above the kiln building is fully inclosed to insure against dust loss. The lime can be discharged from the skip bucket through chutes into two of the six 1,000-ton quick-lime storage silos, or on a 3-deck Link-Belt fully-inclosed vibrating screen. The wire screen cloth openings are varied to suit conditions but are usually 1½- ⅝- and ¼-in. The four sizes of pebble lime can be discharged from this screen into the other



Feed end of kiln with chamber from which dust is reclaimed.

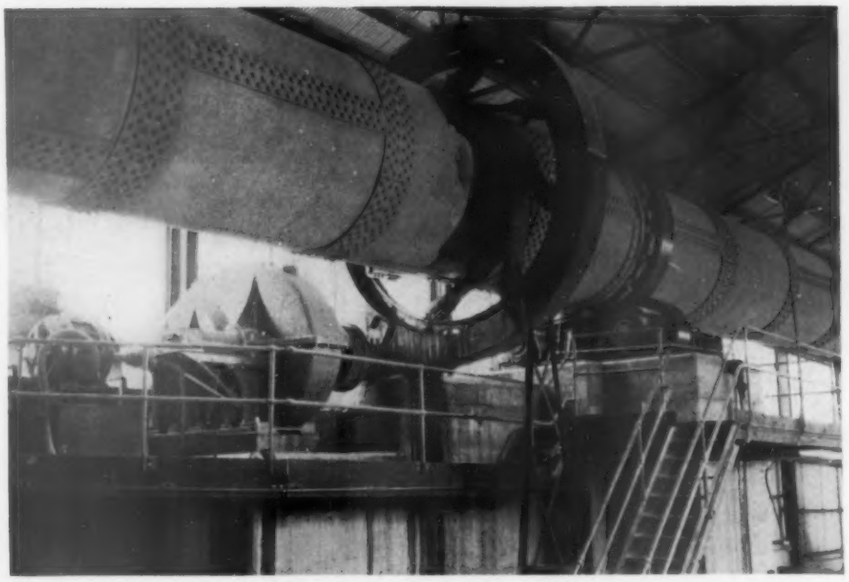
four silos or on a 20-in. horizontal belt-conveyor above them. If desired, the skip bucket can also discharge direct on this conveyor through a small hopper.

The six pebble-lime silos are arranged in two rows and have four 200-ton interstices. Under each row of silos is a 20-in. tunnel belt-conveyor. Three Smidth gates under each silo feed the lime on these belts. These belts discharge on two short 20-in. inclined cross belt-conveyors, both of which discharge to the same 79-ft. Link-Belt bucket-elevator. Both this elevator and the belt-conveyor above

The fan which induces draft through the kiln.

the silos discharge on a 20-in. belt-conveyor which operates on 6-ft. centers and is equipped with a Dings high-intensity magnetic head pulley. The elevator can also discharge through a spout direct into cars.

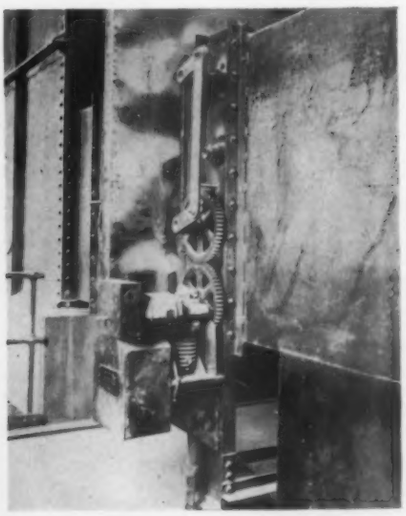
This short conveyor discharges the quick-lime on a Link-Belt fully inclosed, double-deck vibrating screen which is designed to make rapid change of screen cloth possible. The three sizes of pebble lime produced can be discharged by gravity into three fully-inclosed 35-ton steel tanks, from which bags and barrels can be loaded through vertical spouts. Under these tanks is a 20-in. reversible shuttle belt conveyor, which can be fed from the short conveyor or from the three tanks and can load the lime into trucks on one side of the building and into cars on the other side. Box-cars are loaded from this shuttle belt by means of a two section Manierre box-car loading conveyor, which operates at slow speed and is so designed that it can discharge the pebble lime into the ends of the cars without breakage. When not in use this loading conveyor can be swung out of the way inside the building. The shuttle conveyor can be extended to discharge into G. L. E. bulk-material cars on the second track. Pebble lime can also be discharged from any of these tanks to the boot of the above-mentioned bucket-elevator for transfer to the hydrator or pulverizer-feed bins to be described.



The kiln drive gear attached to the kiln shell by spring plates. At left is motor and speed-reducer drive.

The fine size of pebble lime passing through the bottom deck of the screen can also be discharged on a 20-in. inclined belt-conveyor feeding two 100-ton steel bins. Lime is discharged from one of these bins to the feeder of an F. L. Smidth Atox mill. A fan draws up all the mill product into a mechanical separator which is above this mill and integral with it. If desired, the coarse or granular quick-lime can be discharged through a spout for loading or it can be retained in the mill for further reduction. The fine

The rotary kiln with multiple-cell cooler in foreground. Visible below the cooler is the reciprocating lime conveyor.



The louvre damper operated from the kiln board which regulates draft.

Our Congratulations MR. MILLARD

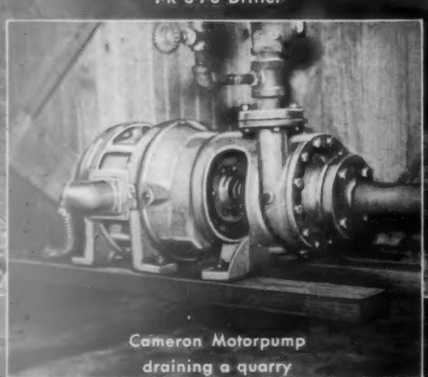
Working a heading with an I-R S-70 Drifter

Ingersoll-Rand congratulates H. E. Millard on the success of his new rotary lime kiln at Annville, Pa.

The business was founded in 1880 as a general quarry. Gradual development of the natural lime deposits since 1920, has made Mr. Millard one of the outstanding manufacturers of all kinds of lime and limestone products.

Mr. Millard has, from the very beginning made use of practically almost the entire Ingersoll-Rand line of quarrying machinery. Large duplex compressors furnish air for operating rock drills and other pneumatic equipment. Much drilling is done with Jackhamers and Drifters. The use of Jackbits has speeded up work, as they drill faster and further than drill steel and are easily resharpened two or three times on the Jackbit Grinder. Cameron Motorpumps and Coupled Pumps are used for draining the quarries and for general water supply.

Ingersoll-Rand is grateful to Mr. Millard for his general acceptance of its products, and extends best wishes for his continued success.



Cameron Motorpump draining a quarry

Ingersoll-Rand

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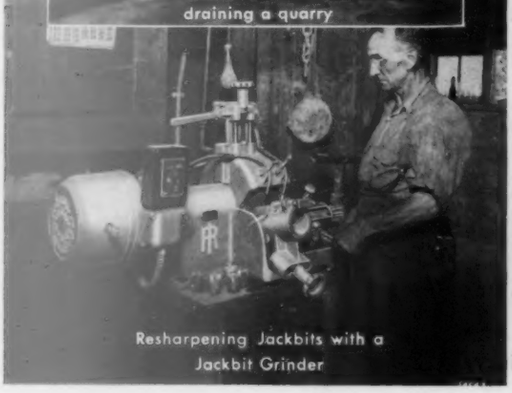
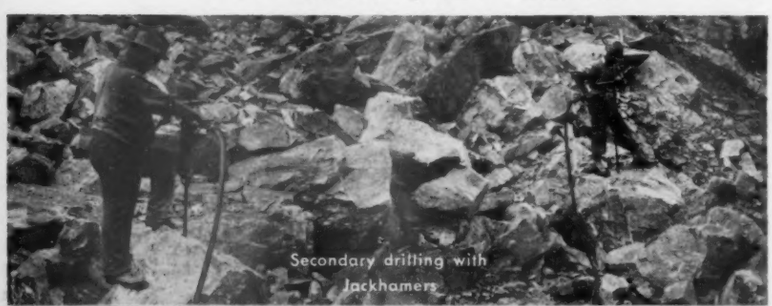
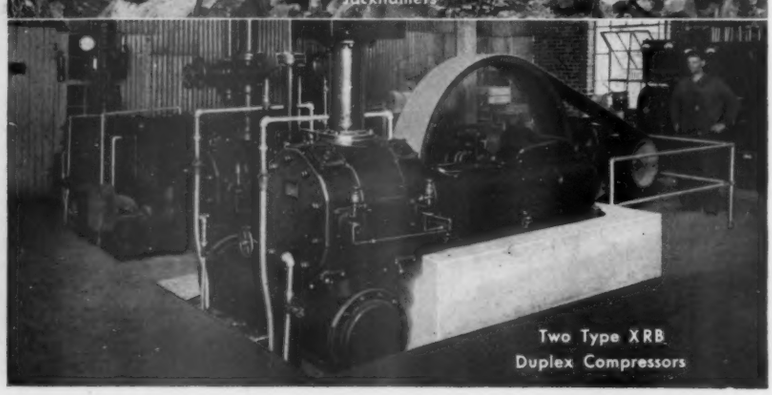


Resharpening Jackbits with a Jackbit Grinder



Secondary drilling with Jackhamers

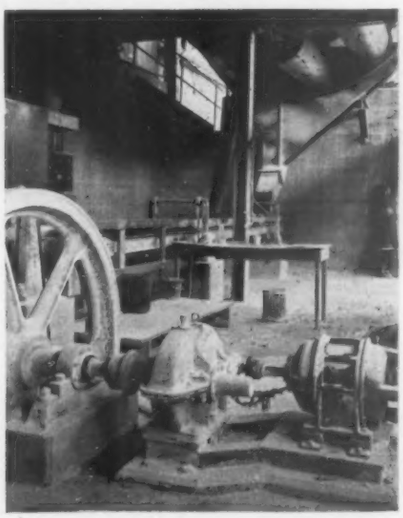


Two Type XRB Duplex Compressors

quicklime is carried by the air stream into a 6-ft. cyclone, which discharges the lime settled out through a powered air lock into a fully-inclosed 100-ton steel tank over a 3-tube Valve Bag packer. Loaded bags are transferred manually on a 24-in. reversible shuttle belt-conveyor which discharges at one end into cars and at the other end into trucks.

The Atox mill has a rated capacity of 3 tons per hr. when grinding ¾-in. minus pebble lime down to a fineness of 95 to 97 per cent. through 200-mesh. The pulverized quicklime produced by this circuit is sold to the chemical, industrial and construction industries.

The other 100-ton pebble lime bin is served by a 10-in. screw-conveyor which can feed the lime into a Jeffrey 24-in. by 36-in. hammer-mill, the product of which is discharged in a 58-ft. bucket-elevator. The lime can also by-pass this mill direct to the elevator which discharges it into a ½-ton surge bin. A Hardinge volumetric feeder discharges the lime into a Kritzer 12-ton continuous hydrator of the latest type. This hydrator has a pre-hydrator with paddles operating at a speed five times as fast as the paddles in the six

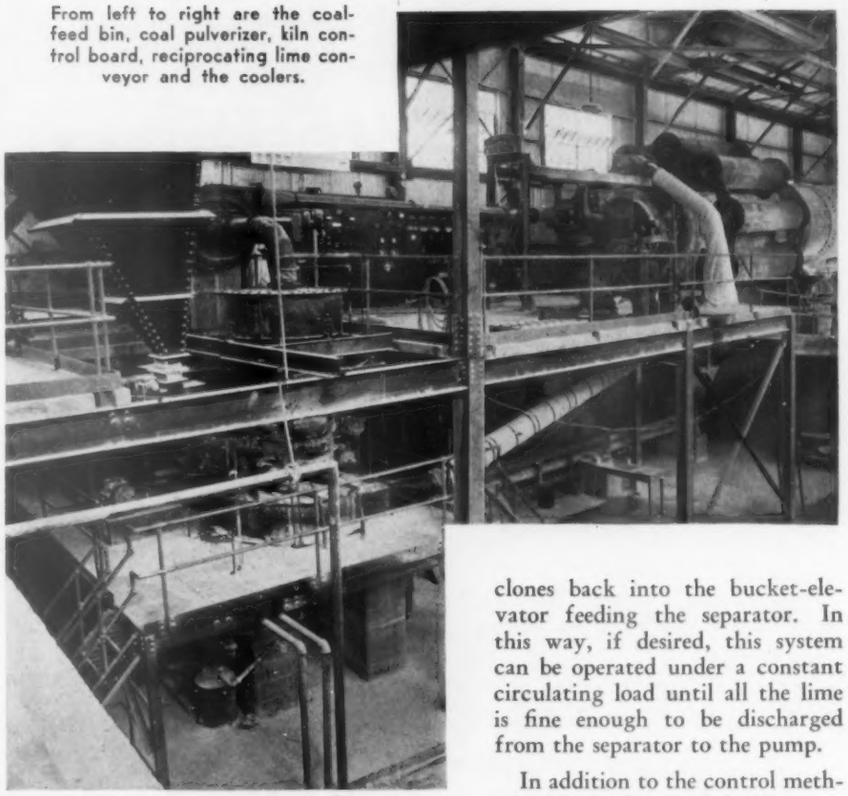


The reciprocating lime conveyor with coolers above.

main hydrating cylinders. The purpose of this pre-hydrator is to bring the water into contact with the lime as quickly as possible and to insure thorough mixing. It incorporates many other features, including the use of roller bearings throughout which has greatly reduced the power requirements. This hydrator is built of boiler plate which is bolted and welded into a rigid whole.

The product of the hydrator is discharged in a 47-ft. bucket-elevator which in turn drops it into a 14-ft.

From left to right are the coal-feed bin, coal pulverizer, kiln control board, reciprocating lime conveyor and the coolers.



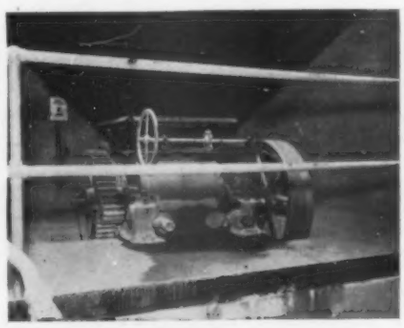
Gayco air-separator. The fine product of the separator, 98 per cent. through 325-mesh is discharged into a Kennedy-Van Saun pneumatic transport system with a capacity of 7 to 8 tons per hr. This pump operates on alternating loading and discharge cycles and moves 1,900 lb. of material per cycle. The lime is discharged through a 5-in. pipe-line direct into a steel tank holding 50 tons of this product. This bin feeds a 3-tube Valve Bag packer. Bags are handled on a shuttle belt-conveyor. This packing and loading system is identical in every detail with the one previously described.

The coarse lime from the separator is carried by a 9-in. screw-conveyor into a surge hopper. Another 9-in. screw-conveyor feeds the lime into a 5-ft. by 8-ft. Kennedy air-swept ball-mill. A fan draws the fine material from this mill and blows it through four 5-ft. Kennedy-Van Saun cyclones which allow the lime to settle out through balanced air-locks into another steel tank which holds 50 tons of this material. This third bagging and loading system is identical with the other two. The product of this circuit is sold as agricultural and building hydrate and has a fineness of 97 per cent. through 200-mesh. A capacity of 5 tons per hr. of this material is being obtained.

The discharge line from the ball-mill has a valve which allows discharge of its product through two 5-ft. cyclones back into the bucket-elevator feeding the separator. In this way, if desired, this system can be operated under a constant circulating load until all the lime is fine enough to be discharged from the separator to the pump.

In addition to the control methods already described further precautions are taken to insure a steady flow of material through the plant. Each bin forming an important link in the plant flow-sheet is equipped with a Bin-Dicator which indicates when the bin is full. Bin-Dicators have been installed on the lime-skip feed hopper, the three pebble-lime tanks, the two hydrator and pulverizer-feed bins, the hydrator surge bin, and the three packer-feed tanks. The Bin-Dicators in the hydrating and loading plant flash bulbs on a signal panel which is visible to all the workers in that department.

Coal is received in bottom-discharge cars from which it is dumped into a track hopper, under which is a Jeffrey 24-in. by 24-in. single-roll crusher which discharges on a 20-in. horizontal belt-conveyor. At present slack coal of 14,200 b.t.u. content and low ash content is being used and this is by-passed through the crusher. This



The single-roll crusher under the coal track hopper.

ROTARY KILNS FOR LIME BURNING

The Kiln illustrated is installed in the lime plant of H. E. Millard, Annville, Penna.

The advantages of the Unax Rotary Kiln are:
Low fuel consumption.
Reduced cost of production.
Better quality and greater uniformity of product.

The modern efficient Unax Rotary Kiln for calcining lime is the result of our many years experience in manufacturing and engineering hundreds of rotary kilns in such industries as cement, ore, lime, chemical.

The Unax Cooler is integral with the kiln and provides efficient cooling of the calcined material by means of the air for combustion which thereby becomes preheated to a high degree.

The FLS Centralized Kiln Control concentrates at one convenient point the control switches of the kiln and auxiliary equipment, sequence interlocks, alarms, signals, and instruments showing speeds, drafts, temperatures, etc., constantly presenting to the kiln operator a clear, quick picture of the kiln's operation.

The FLS Gas Analyzer permits obtaining complete combustion of the fuel while avoiding excess air in the kiln.

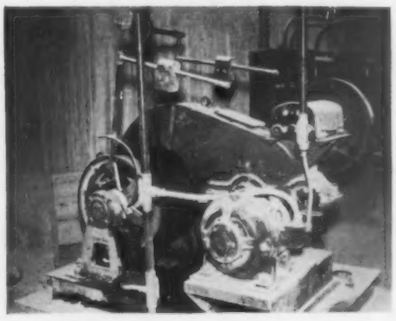
F. L. Smidth & Co. are manufacturers of Rotary Kilns, Coolers, Grinding Machinery and auxiliary apparatus, and in addition are Engineer Specialists in designing and equipping plants employing such machinery.

F. L. SMIDTH & CO.

225 BROADWAY — Engineers. — NEW YORK, N. Y

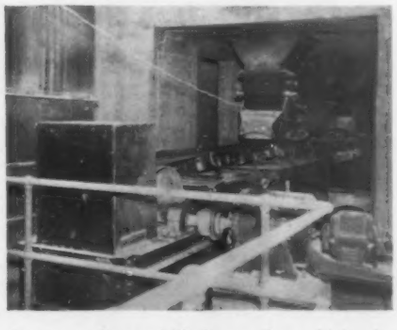
conveyor discharges the coal in a 50-ft. Link-Belt bucket-elevator which drops it either into the 500-ton storage silo or on a 20-in. shuttle belt-conveyor. Coal is reclaimed from this silo through five gates which discharge it on a 20-in. tunnel belt-conveyor feeding the coal elevator already described. Coal is discharged from the shuttle conveyor into the 25-ton coal-mill feed bin.

A feeder discharges coal from this bin into the direct-firing coal mill. This is an F. L. Smidth Size 8 Atox mill, which is of standard design except that only two of the four grinding rolls are used. A Smidth fan draws hot air at a temperature of from 200 to 400 deg. F. as desired from the kiln hood through the mill and blows it with the pulverized and dried coal through the burner pipe into the kiln. The temperature required varies with the moisture content and other characteristics of the coal. This primary air has a temperature of about 150 deg. F. The coal is pulverized to a fineness of 95 to 97 per cent. through 200-mesh and the mill easily produces the kiln requirements of about 1,500 lb. per hr.



The hoist operating the pebble-lime skip.

Once it was decided to go ahead with the construction of this plant, no time was lost. F. L. Smidth & Co., with the aid of the Millard staff, designed that part of the plant up to and including the quicklime storage silos. While construction of this part of the plant was under way the hydrating and loading plant was being designed by W. R. Cliffe, chief engineer, and others of the Millard staff.



Gates under pebble-lime silos which discharge on tunnel belt-conveyor.

F. L. Smidth & Co. supplied the kiln feeder, the rotary kiln and Unax coolers, the Atox direct-firing coal mill, the Atox quick-lime pulverizer, the lime Skipulter, all the gates under the storage silos, and all the control devices and instruments necessary to operate this equipment.

The General Electric Co. supplied all except a few of the motors, all the other electrical equipment, and the disk brakes on the motors driving the inclined belt-conveyors and the bucket-elevators. Roebling electrical conduits and cables are used exclusively.

The Link-Belt Co. supplied all the belt-conveyor idlers and pulleys, the steel-inclosed chain-bucket elevators, the two vibrating screens, and several screw-conveyors. Timken bearings are used in all this equipment and all inclined belt conveyors have gravity take-ups. Several P. I. V. variable-speed drives were also furnished.

Belt-conveyor over top of lime silos is shown above. Below is conveyor with magnetic head pulley.

The M. A. Long Co. built the 100-ft. kiln stack, and the two stone, six lime and one coal silos.

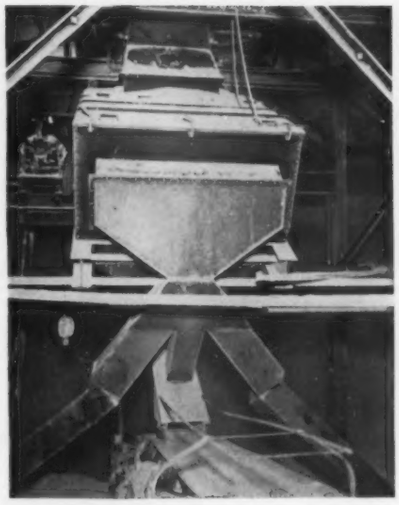
The Kennedy-Van Saun Mfg. & Engr. Corp. supplied the air-swept lime ball-mill, the pneumatic conveying system, and all the cyclones.

The Jeffrey Mfg. Co. supplied the single-roll coal crusher and the hammer-mill in the hydrating department.

The H. H. Robinson Co. supplied the Protected-Metal siding and roofing with which all the plant buildings are inclosed. A total of 1,300 sq. yd. of this corrosion-resisting sheathing was used in this plant.

Frank S. Weaver & Co., Lansdale, Pa. fabricated and erected the structural-steel buildings and the steel tanks and bins.

All the lubricating oil, grease and other petroleum products used in this plant and by the company are supplied by the Atlantic Refining Co.



The inclosed vibrating screen which makes final separation of pebble lime.

Falk flexible couplings are used on most of the motor drives and Falk speed-reducers or motor-reducers are used on all the belt-conveyors and bucket-elevator drives and many other drives.

The Valve Bag Co. supplied the two hydrate packers and the quick-lime packer and also supplied all the valve bags used.

The International Cooperage Co. supplied all the steel barrels used for the shipment of pebble lime.

The exteriors of all the new buildings are painted with Vita-Var Corp. "Wallgard" aluminum paint.

Box-car loading conveyor shown extended as if in use inside car.

Most of the conveyor belting was supplied by the U. S. Rubber Products Co. Some Thermoid belting is also used.

All the deposits owned by Mr. Millard are located in the Cambro-Ordovician ledge of high-calcium limestone which extends from Bellefonte, Pa., east into New Jersey. Several of the largest lime plants in this country are located along this ledge, which also supplies cement rock to cement plants in the Lehigh Valley. The Millard holdings begin at a point near Myerstown, Pa., where he operates a crushed-stone plant. The principal product of this plant is flux stone, although some crushed stone is also produced.

5 MARIONS DO THE LOADING IN H. E. MILLARD'S 5,000 ACRE QUARRY

Because of the vast extent of these quarries, the loading shovels had to possess extreme mobility, sturdy construction, give speedy performance, and operate easily. That's why H. E. Millard selected MARIONS.

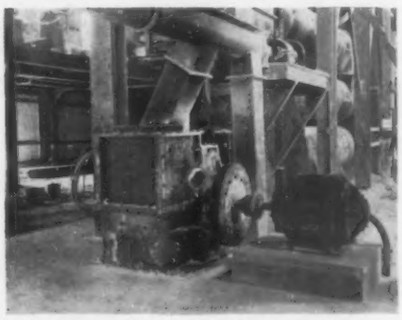
MARION is proud of the part it is playing in Mr. Millard's 5,000 acre quarry and in countless other rock products plants throughout the world.

Write for bulletins describing the machines in which you are particularly interested.

MARION
STEAM SHOVEL COMPANY
MARION, OHIO, U. S. A.

At Swatara Mr. Millard operates a vertical-kiln lime plant. In 1937 a roll-crusher there was replaced by a 36-in. by 48-in. Farrell jaw crusher.

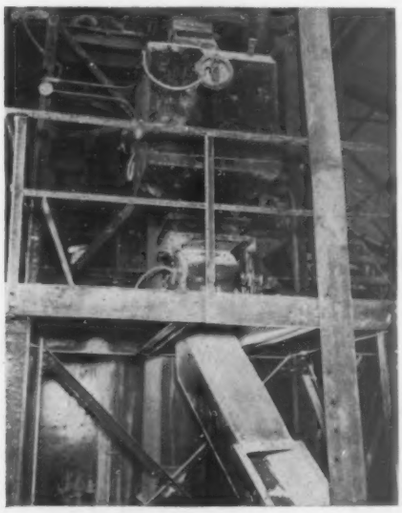
The workings at Annville extend 5 mi. west to the town of Palmyra, where a vertical-kiln lime plant is operated. Spalls are sold as flux. At the east end of this deposit Mr. Millard



The hammer-mill which reduces pebble lime before feed to hydrator in background.

operates a pulverized-limestone plant. There the character of the stone is entirely different from that at other points and some of it is so soft that it can be pulverized in the hand. Because of the growing demand for agricultural limestone and for pulverized limestone for mine dusting, and for chemical and other industrial uses, Mr. Millard is now enlarging this plant. The existing pulverizer is being replaced with a Kennedy-Van Saun air-swept ball-mill with a capacity up to 25 tons per hr. This mill will be connected to a series of cyclones and the product will be dried in a 6-ft. by 6-ft. by 55-ft. Kennedy-Van Saun tower drier. The present 2-tube bag packer at this plant will be supplemented by a 4-tube Valve Bag packer.

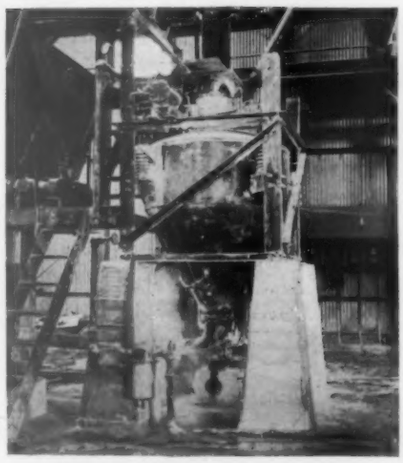
A very complete description of all these operations was published in the November 4, 1931 issue of PIT AND QUARRY.



The hydrator feed bin with two automatic level indicators. Below is volumetric feeder.

At the main Annville operations five quarries were formerly operated, each with its individual loading and handling equipment. In 1933 a series of heavy rains flooded four of these quarries to such an extent that it was decided temporarily to discontinue their operation because of the high pumping cost and the low demand at that time. These four quarries were allowed to fill up with water and until January, 1937, all the demand was supplied from the No. 5 quarry which is above water-level. None of the equipment was removed.

At that time a temporary pump-house was built with three Ingersoll-

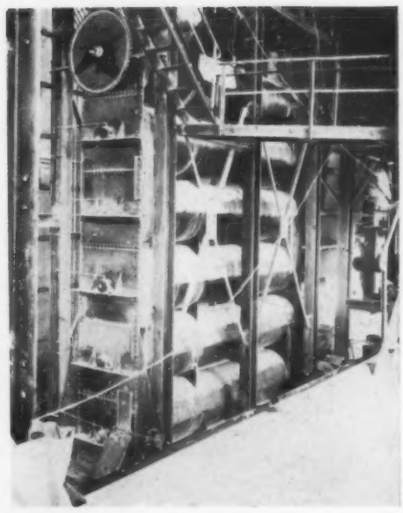


The pneumatic transport system which discharges fine separator product into packer-feed bin.

Rand centrifugal pumps, one rated at 10,000 and two at 5,000 gal. per min. These pumps drained out the quarries in two months, about the same time it took them to fill up. Since that time a force of workers has been busy reconditioning the shovels, cars, crushers, motors and other equipment which had been under water for over three years.

The permanent pump-house for these quarries was also under water. This contains six Ingersoll-Rand centrifugal pumps with a combined capacity of 21,000 gal. per min. and connected to motors totaling 1,000 hp. A 3,500-gal. pump normally handles the water which filters into the quarry through numerous sink-holes and crevices and which drains from all the quarries into a sump. The other pumps are kept in reserve for emergency use.

Since the new lime plant went into operation quarries No. 1 and No. 5 have been operated to supply the lime plant and the two crushed-stone plants at this location. Quarry No. 4 was put back into operation recently and



The 12-ton six-cylinder continuous hydrator with pre-hydrator above.

is now supplying these plants. Quarry No. 1 has been abandoned and Quarry No. 5 will be used only for hand-loaded stone requirements.

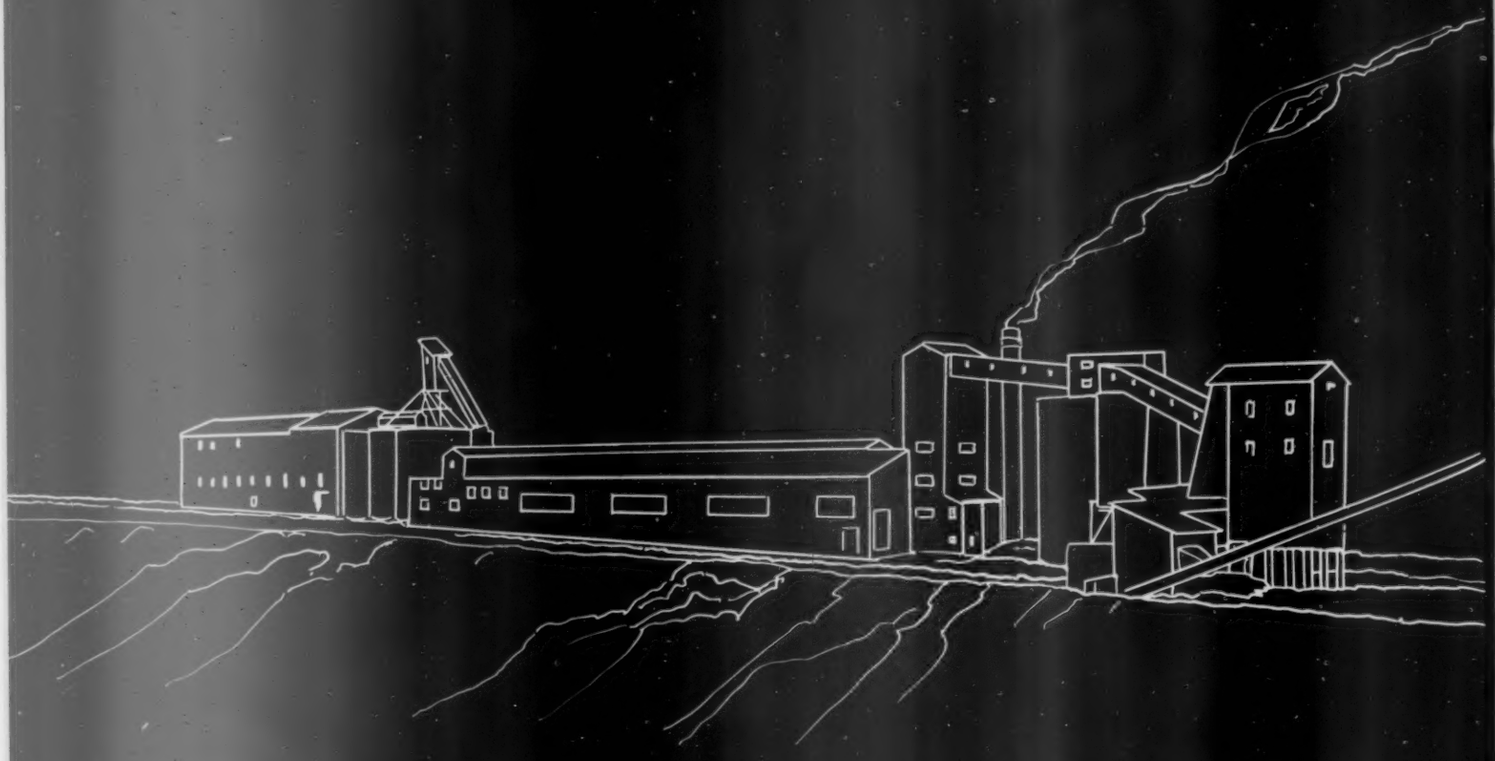
Quarry No. 4 has a face 100 ft. high and 400 ft. wide, the full width of the deposit. The overburden averages from 5 to 15 ft. in depth and is removed by shovels, draglines and trucks. Blast-hole drills are used and double-row staggered shots are made, using Cordeau-Bickford fuse and Du Pont explosives. Ingersoll-Rand Jack-

Bags being loaded by one of the three 3-tube packers.

bits and Bethlehem drill steel are used for secondary drilling.

In this quarry the first 40 ft. of rock is more suitable for cement and flux stone and is loaded by hand for this purpose. The 60 ft. of rock at the bottom of the quarry face is of such quality that it can be loaded by shovels without hand selection. Loading is done with two electric shovels, a Marion No. 37 and a 1¼-cu. yd. Bucyrus-Erie. Two gasoline locomotives, a 5-ton Whitcomb and an 8-ton Plymouth, haul the stone in 5-ton quarry cars to the No. 10 Kennedy-Van Saun gyratory crusher at the quarry level. The minus 8-in. product

LOWER TONNAGE COST
with HEWITT Conveyor Belt



The new H. E. Millard rotary kiln lime plant, Annville, Pa., equipped with HEWITT Conveyor Belt.

● Up . . . up . . . to increasing tonnage records in materials handling. That's part of the story of HEWITT conveyor belts. The other part is found in progressive plants where costs are checked. Here is established the proof that HEWITT conveyor belts lower tonnage costs. For in back of the production of all HEWITT industrial rubber goods is that main purpose . . . to add extra stamina and sturdiness, to build in longer life, to the end that YOUR operating costs may be lowered. Wherever your plant is located, a nearby HEWITT distributor will welcome the chance to prove the wisdom of a switch to HEWITT hose and belting. He is listed in the classified telephone directories of major industrial centers under "Rubber Goods" or "Belting".

HEWITT
RUBBER CORPORATION
BUFFALO, NEW YORK

HOSE • CONVEYOR AND TRANSMISSION BELTS • PACKING

of this crusher is discharged on a 36-in. by 92-ft. Stephens-Adamson belt-conveyor, which discharges the stone into a stock-pile. Apron feeders reclaim the stone from storage and discharge it into the two 2-ton cars of a Kennedy-Van Saun balanced skip-hoist.

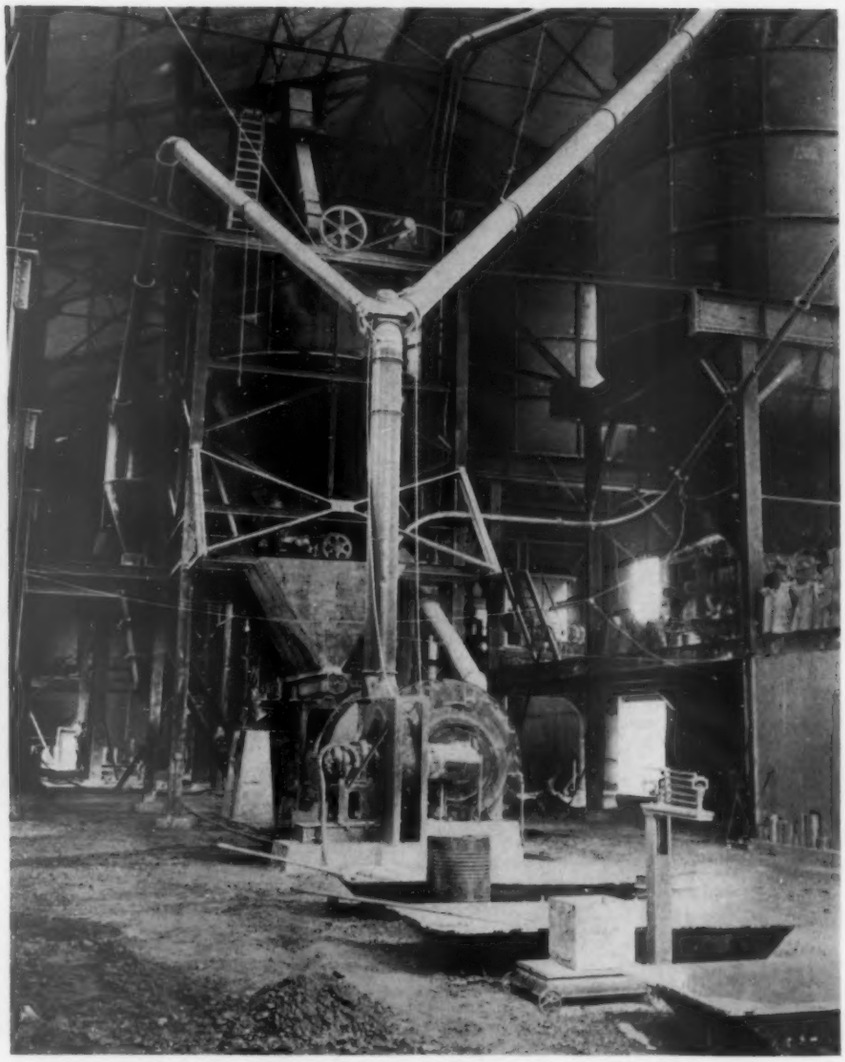
This skip carries the stone 250 ft. up an incline to a point above plant level where it is discharged into a surge hopper. This hopper feeds a new 4-ft. by 10-ft. Kennedy-Van Saun vibrating scalping screen with 4-in. openings. The 4-in. to 8-in. stone retained on

Pan-conveyor which feeds stone from track hopper into new gyratory crusher.

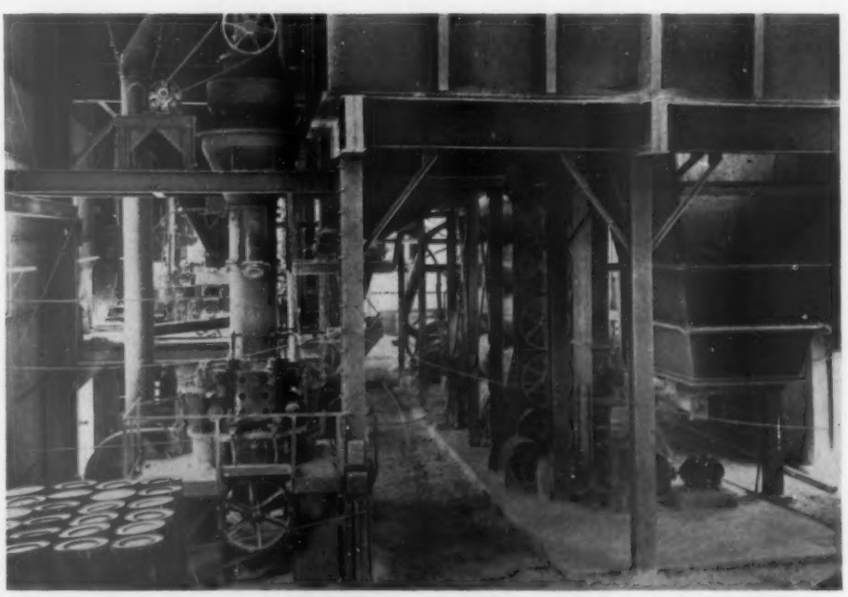
this screen can be loaded direct into railway cars and shipped as flux or cement rock. This large rock can also be sent to either of the two crushed stone plants. One of these plants is a dry crushing and screening operation from which the new lime plant is ordinarily supplied. The other plant is a crushing, screening and washing operation from which the lime plant can be supplied when desired. The dry plant was almost completely rebuilt early in 1937, when a new crusher and two new screens were installed.

The 4-in. to 8-in. stone from the scalping screen can be discharged into a No. 8 Kennedy-Van Saun gyratory crusher or on a belt-conveyor which carries the stone through a tunnel to the dry plant. The product of this crusher can be discharged on this conveyor if desired, or on a short tunnel belt-conveyor which feeds a return conveyor discharging on the main conveyor running to the wet plant.

The minus 4-in. stone passing through the scalping screen drops on a 3-ft. by 6-ft. Kennedy-Van Saun vibrating screen on which openings varying from 1 in. to 1½-in. are used as needed. The material passing through this screen is discharged on the main conveyor running to the wet plant. The material retained on this screen is discharged into a No. 25 Kennedy-Van Saun gyratory crusher, the



View from far end of hydrating building showing cyclones, separator, tube-mill and fan, packers and their feed bins. In foreground is some of physical-testing equipment.



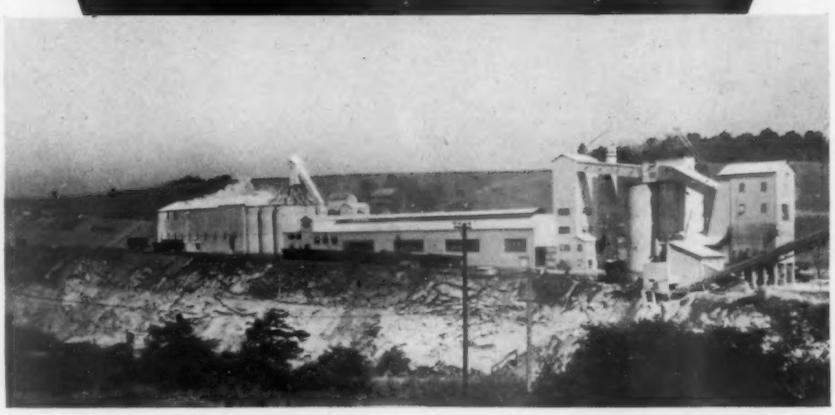
View from other end of hydrating building showing quicklime mill and separator and hydrator- and mill-feed bins.

Stone silos and stack at left. Coal silos at right.

The M. A. LONG Building Service

Close-up of stone silos with lime silos in background. Note quality of construction.

New Lime Plant of H. E. Millard Co., near Annville, Pa.



Kiln stack 6' diam. by 100' high. Two stone silos 30' diam. by 65' high. Six lime silos 30' diam. by 70' high. Coal silo 30' diam. by 40' high.

Outstanding Lime Plant Construction by LONG

The new Millard plant recently erected at Annville, Pennsylvania, marks a forward step in lime manufacture, as the most modern production methods are applied for the first time to the making and handling of lime.

In keeping with the company's policy of using the most advanced types of equipment and construction, the M. A. Long Co. was selected to build the concrete kiln stack and the stone, lime and coal storage silos, including two 2000-ton silos for stone, six 1000-ton silos for quicklime, and a 500-ton coal silo.
This is a completely engineered job in design and erection, and its efficient application for the purpose is assured by the experience and responsibility of the M. A. Long organization.

Write for full information regarding Long Building Service, which includes the design and construction of Cement, Lime, and Storage Plants and Grain Elevators.

The M. A. LONG Co.

Engineers and Constructors

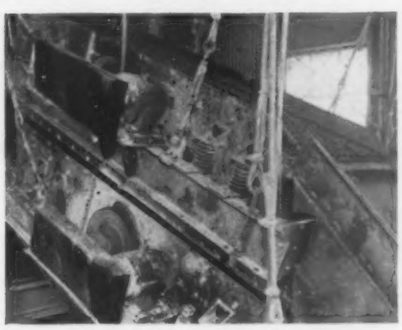
10 W. Chase St., Baltimore, Maryland

Allentown — Chicago

product of which is discharged to the same series of conveyors which feed the product of the No. 8 crusher to the main conveyor running to the washing plant.

This conveyor discharges the stone into a 4-ft. by 12-ft. rotary scrubber which drops it on two 3-ft. by 6-ft. Stephens-Adamson vibrating screens. The fine product of these screens can, if necessary, be diverted to a McLanahan & Stone log-washer for additional cleaning and is then returned to the screens by means of a bucket elevator. The finished sizes of stone are discharged into bins from which they are loaded into cars or trucks for shipment. Trucks can also take stone from these bins to the lime-plant hopper feeding the stone skip hoist already described.

The reversible tunnel cross conveyor running to the dry-stone plant discharges the stone into a new No. 22 Kennedy-Van Saun gyratory crusher. A track hopper also makes it possible to feed stone to this crusher from cars or trucks if desired. A new 4-ft. by 10-ft. Kennedy-Van Saun continuous pan-conveyor feeds the stone from the hopper into this crusher. This hopper is used for hand-loaded stone and makes it possible to use stone from other quarries should this ever be necessary.



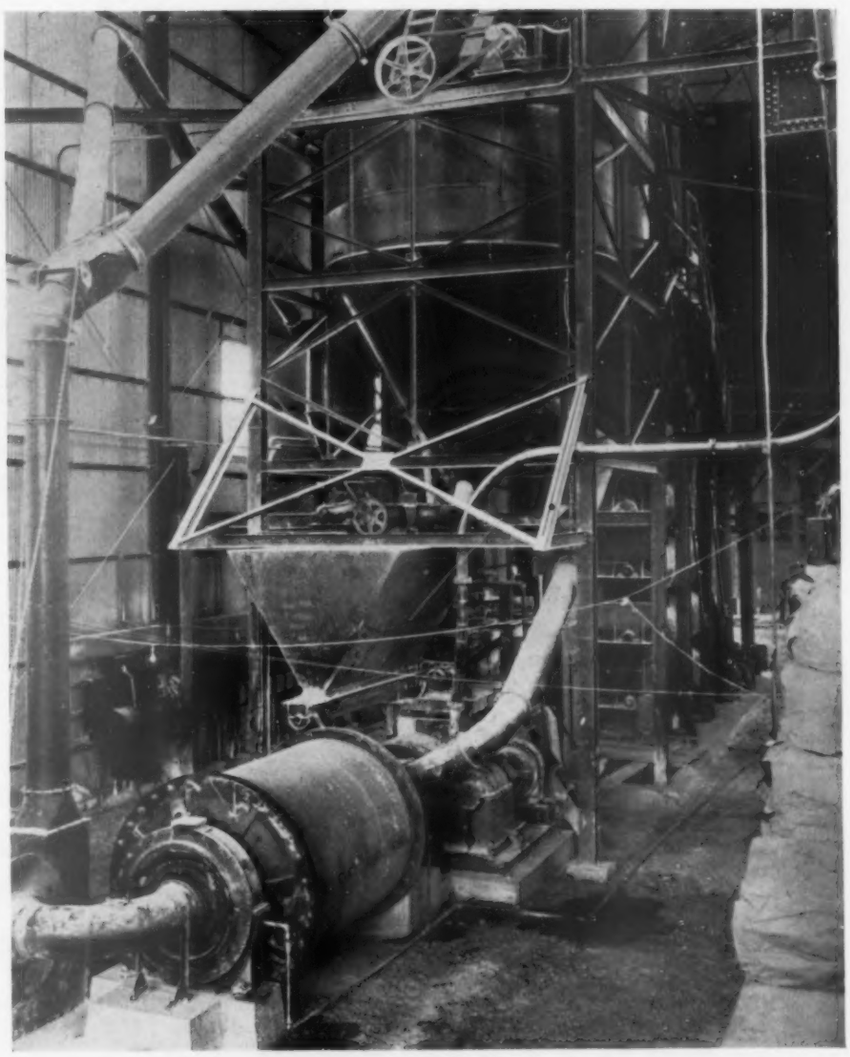
The two new vibrating screens in the dry crushed-stone plant.

The product of the No. 22 crusher is discharged to an inclined Link-Belt belt-bucket elevator operating on 94-ft. centers. This elevator discharges the stone through a split chute on two 4-ft. by 10-ft. Kennedy - Van Saun 3-deck vibrating screens. All the products of these screens can go direct into bins from which railway cars or trucks are loaded through side chutes.

J. Ben Millard, superintendent of the Swatara and Palmyra plants.

Gates under these bins can discharge the stone on a horizontal

No. 4 quarry viewed from top of new lime plant. Steam shovel on ledge in background temporarily supplied lime-plant needs from this ledge while the No. 4 quarry was being drained and cleaned up and the primary crushing plant in the quarry was being rebuilt.



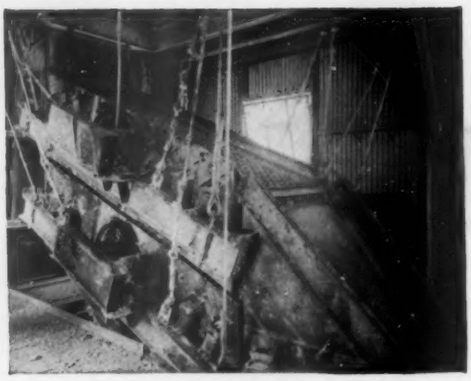
View from packing floor showing tube mill and fan with separator and continuous hydrator in right background. At upper left is valve in line from mill which allows return of mill product to separator if desired.

Look at the record!

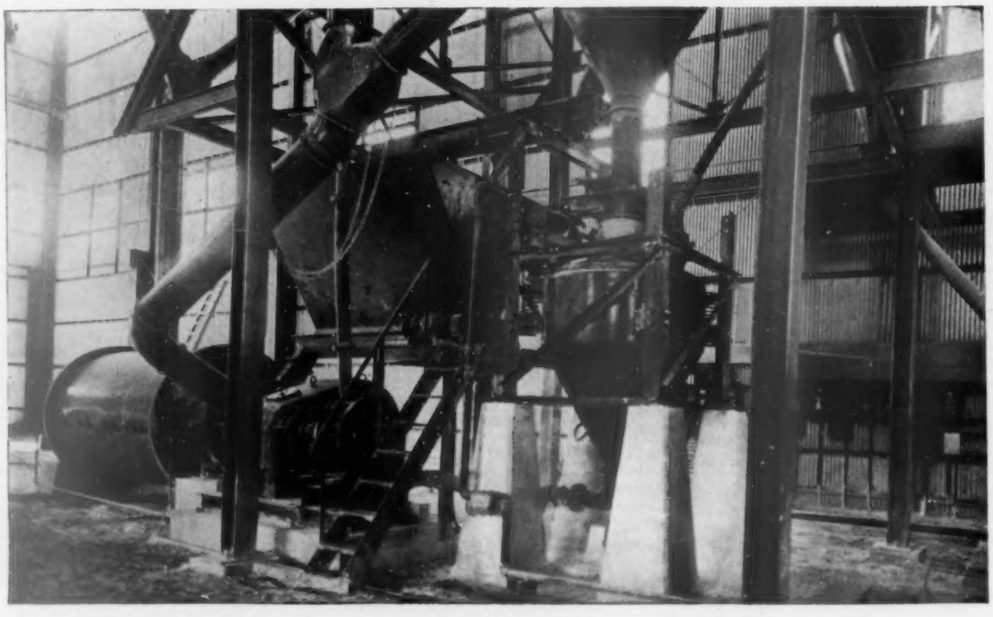
H. E. MILLARD

OPERATES

16 KENNEDY GEARLESS PRIMARY AND SECONDARY CRUSHERS



7 KENNEDY VIBRATING AND REVOLVING SCREENS



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Comprising Kennedy Gearless Air Swept Mill and Kennedy Pneumatic Transport System
Kennedy Feeders, Conveyors, Elevators, Classifiers and Bin Gates Are Also Installed in Millard Plants

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KENNEDY-VAN SAUN

MFG. & ENG. CORPORATION

TWO PARK AVENUE NEW YORK, N. Y.

belt-conveyor which returns it to the No. 25 gyratory crusher for further reduction and back over the screens. This reclaiming conveyor can also discharge stone from the bins on the reversible tunnel belt-conveyor running to the wet plant for washing, if this is ever necessary. Stone for the lime plant is fed from these screens direct to the conveyor system of that plant. If necessary, trucks can also transfer stone from the dry-plant bins to the stone-skip hopper.

The primary crusher in the quarry has a capacity of 500 tons per hr., the dry plant can produce 250 tons per hr., and the wet plant 200 tons per hr.

This operation is at present supplying large quantities of stone for a concrete-highway construction pro-

Finishing touches being made with one of arc welders which were important in plant construction.

gram in the vicinity. To suppply this demand a batching plant has been installed on the property to batch the cement and aggregates. A Marion No. 37 electric crawler crane feeds stone to the batcher bins from cars or stockpiles and sand from cars.

All the water used in the operation of the crushed-stone and lime plants is obtained from the quarry-drainage system already described. A pump at plant-level pumps the water into a 50,000-gal. concrete reservoir on the top of a hill overlooking the plant. This reservoir is so designed that it can also be used as a swimming pool. The pipe-line to the reservoir has check valves so arranged that the same line can feed water by gravity to the various points where it is used. Johns-Manville Transite water-lines are used.

Compressed air for quarry and plant operations is supplied by two Ingersoll-Rand Imperial Type X compressors.

The late J. B. Millard, founder of this flourishing industry, and father of the present owner, H. E. Millard, came to Annville in 1880, and opened a quarry to produce flux for the steel mills which abounded in this territory at that time. He later opened another quarry at Lebanon and then began to supply stone to the cement plants in the Lehigh Valley. Commercial crushed-stone production was begun in 1915 and about this time J. B. Millard also began to produce lime on a small scale.

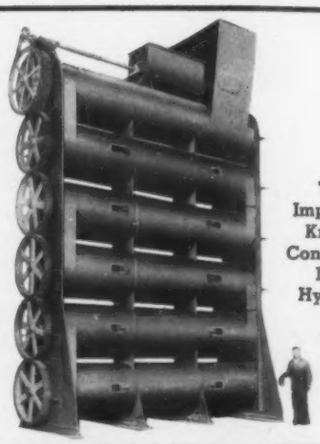
H. E. Millard was born Dec. 17, 1876 and went to work in his father's plants in 1890 at the age of 14. Starting as a waterboy, he advanced through the ranks and at the age of 18 was a foreman. In 1905 he was taken into partnership and the firm became J. B. Millard & Son. In 1917 J. B. Millard decided to retire and sold a half interest to his son. E. D. Williams, who has been in Mr. Millard's employ for 17 years is now general manager of all his properties. W. R. Cliffe, who is chief engineer of his plants, is an outstanding lime plant engineer and operator. He was for 11 years general superintendent for the American Lime & Stone Co. at Bellefonte, Pa. He left this company in 1935 to design and build the new plant of the Chemical Lime Co. at Bellefonte. Before that plant was completed, however, he left that company to assume his present position.

In acquiring these extensive deposits, which average approximately 400 ft. in width but are many hundred feet in depth, Mr. Millard also had to purchase large acreages of farm land. On his holdings from Myerstown to Swatara he has 24 farms comprising a total of about 5,000 acres. Some of these farms are rented to tenants on shares and others are operated under the supervision of a farm manager.

From left to right: H. E. Millard, owner; E. D. Williams, general manager; W. R. Cliffe, chief engineer; C. W. Dunlap.

Mr. Millard has a son, J. Ben Millard, who is superintendent of the Swatara and Palmyra plants and a daughter, Mrs. Williams. His hobbies are his prize horses, dogs and cattle. He has three grandsons, children of Mr. Williams, with whom he rides daily over the numerous bridle paths and jumps laid out on his properties.

Mr. Millard has taken many prizes with his black Angus cattle, and his jumping horses have won ribbons at large horse shows in the east. He is especially proud of his horse, Big Chief, on which his 9-year old grandson and namesake Harry Williams won the "touch and out" jumping competition at Devon, near Philadelphia last May. This horse easily clears a 6-ft. jump. Mr. Millard himself has gained a wide reputation as a trapshooter and hunter.



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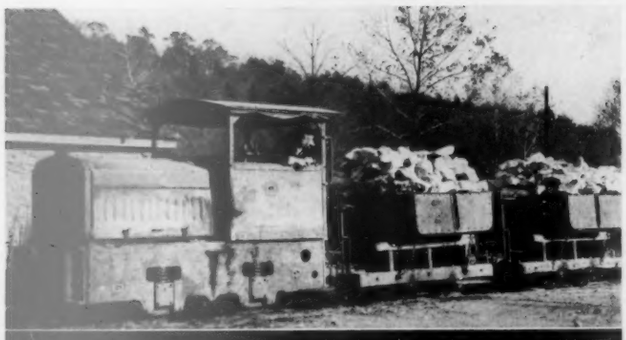

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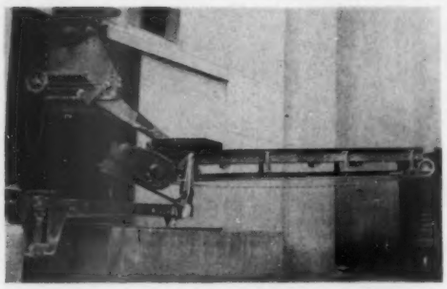

AT MILLARD LIME PLANT

Advanced methods of material handling typify the operations of the new outstanding lime plant of H. E. Millard Company, as indicated by the use of Manierre box car loader for pebble lime. The cars are loaded from a shuttle belt delivering the material to a swivel chute which delivers directly to the box car loader belt, which swings and extends in any direction. It is not necessary to enter the car while loading and one operator can load three to five tons of lime per minute without breakage of lime.

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MORE OPINIONS ON THE LABOR QUESTION

Presented here are additional letters from leaders in the nonmetallic-minerals industry in which they state their views on the broad question of labor relations. Following the style of presentation begun in the July issue of PIT AND QUARRY, they are published anonymously, the producing group to which the writer belongs merely being indicated.—Editor.

UNIONIZATION of workers in stone plants is undoubtedly on the way.

Unionization will undoubtedly adversely affect relations between management and employees, due to the fact that consultation on questions most vitally affecting the men will be conducted through labor leaders, who will in most cases be strangers to both men and management. Personal contact between men and management will still continue but not with the same degree of confidence.

Locally it will improve the economic status of the workers due to increase in wages, but when this is thought of on a national scale it is questionable whether it will have that result. There will no doubt be some improvement, but not such as would be expected from the increase in wages because of the resultant increase in the cost of living.

For employees in crushed-stone plants the "vertical" or industrial union is no doubt preferable to the "horizontal" or craft union. However, in and about most metropolitan areas the craft unions will probably prevail due to the fact that they are already so well organized in the building trades and construction industries in most cities.

Preference for the "vertical" type of union does not mean preference for the C.I.O. which usually employs this type. The thing to be desired in metropolitan areas would be a "vertical" type affiliated with the A. F. of L. so that coöperation could be maintained between the quarries and the construction industry generally. It is probable that the craft unions will resist the formation of "vertical" type unions even though affiliated with the A. F. of L. This is due to the desire on the part of the individual craft unions to secure this additional membership, along with which goes additional initiation fees and dues.

Every employer should be concerned about the economic position of his workers. I doubt if compulsion by legal means would help in this. It should be a natural desire. Every opportunity should be taken to reduce the number of interruptions in employment. Much can be done in this respect with all but the seasonal employment. Most quarries can not entirely overcome the seasonal lay-off.

As to wages, the ideal would be a standard which would provide all workers with a wage sufficiently high to allow for some extras over and above the bare necessities of living. The amount of this can not be the same for all, nor can it be the same for different industries, but generally speaking the greater the amount is over and above the necessities of life the greater will be the prosperity of the nation, and, what is more important, the more stable it will be, provided the increases in wages are not passed on two- or threefold in the form of higher prices, which would of course destroy the advantage gained from this increased purchasing power in dollars.

The definite limitation of hours worked by government is, in my opinion, economically unsound. Regulation through the establishing of a basic work day, with a provision for time and one-third or time and one-half to be paid for time worked in excess of the basic day, is probably all right. This was rapidly being brought about by the unionization of employees and the movement would naturally have gained rapidly with the increased number of union members. Probably no law is necessary to cover this.

(*Crushed Stone*)

* * *

It begins to look as though complete unionization of employees in industry will be effected. My attitude toward this is that while I do not think it is necessary in our particular industry, I would not make any attempt to block it provided it was the desire of my employees to unionize. I would have no objections to negotiating with union representatives, provided the unions they represent were responsible. The trouble is that to date all the legislation in this regard has been one-sided; that is to say, it has been for the unions and the employer has had no consideration whatsoever. I do not think that to date this legislation has in a broad sense improved the status of employees; on the other hand, I think the tendency has been in the other direction.

Regarding preference for any particular type of union, I must confess that I don't have the answer. It seems to me it depends again upon the responsibility of the organizations.

In my own organization we have always tried to be considerate and fair in all our employee relationships, and I believe that this policy has so far been entirely successful.

I feel that possibly for some industries, it might be practical to limit the hours of employment by law. In the crushed-stone and sand-and-gravel industry, because of its seasonable character, this would effect considerable hardship on both the employer and the employee.

(*Crushed Stone*)

* * *

I feel that unionization of our workers will come ultimately. In my opinion it will affect workers temporarily for the worse, due to misunderstandings, but I think it will, in the end, contribute toward improving the economic condition of the country as a whole.

I prefer the craft type of union because by dealing with each craft separately it is possible to obtain more intelligent coöperation between the management and the employees included in each craft. There is a great difference in the mentalities of individuals composing the different crafts, and on that account it would be more difficult to deal with them in a vertical type of union. However, it appears that the vertical type of union will predominate, at least in the near future, on account of the political forces behind it, but I do not think it will stand up for any long period of time as it is impractical.

I feel that we should be concerned about our workers' welfare but I do not think that we can rearrange our business to reduce any further the

number of interruptions and irregularities in production. Neither do I think that business could raise wages sufficiently to provide workers with a full year's living expenses for less than a full year's work. Our plants are located outside large centers of population. When they are not employed in our plants, our workers can use their time profitably in agriculture. Many of our employees own small farms which produce a large part of their food products, as well as some surplus for the market. This arrangement tends to reduce the labor turnover, reduces accidents, and increases efficiency in general. There should be coöperation between employers and workers in an effort to solve this problem.

I believe that wages should be high enough to provide a surplus for some comforts above the necessities, because public purchasing power is important to the economic health of the country. I would expect our own business to benefit ultimately from improved purchasing power.

Owing to the replacement of man labor by machinery, I believe the working hours of all people, including industrial workers and those in the professional and agricultural classifications, should be regulated so as to allow every man, dependent woman and child over 18 years of age to earn a legitimate living. I believe that the continuing displacement of man power by machinery will decrease the ratio of employed time to the total potential existence time of the average worker, and I would advocate the making of the necessary readjustments to accelerate that trend. Some of the gains of labor-saving machinery might be passed on to the workers by shortening hours, increasing wages, unemployment insurance, and old-age pensions.

It is my opinion that the goal set by the New Deal is worth serious trial, as its apparent object is benefits for the little man. Such benefits can result only in ultimate success for the other members of society. In all revolutionary ideas there are necessarily some mistakes in the original plans, as well as mistakes in administration. This was obvious in the administration of the W.P.A. The first years of organization were ones of enormous waste. However, this organization in our part of the country is becoming reasonably efficient and is accomplishing wonderful results. I think the same may be experienced with other New Deal ideas if they are given an opportunity to work.

(Crushed Stone)

Unionization is increasing; whether or not it will include all our activities is, of course, uncertain. In our individual case I do not believe unionization will seriously interfere with our relation to our employees. Our principal reason for avoiding it is that we do not wish to be used in an attempt to coerce the employees of others, particularly our customers. In our city most of the crushed-stone plants are now organized. Our own employees, by their own choice, so far have not organized. If they were organized, I believe the unions would attempt to force the unionization of all construction work in this vicinity using crushed stone by refusing delivery of crushed stone to non-union construction jobs. This result would, I believe, be undesirable for everyone concerned as it would result in substantial increases in the costs of all construction work, particularly in the construction of residences. It is very doubtful if the buyers will absorb much increased cost, and the result would probably be a marked decrease in construction and in employment.

Undoubtedly union activities have resulted in improving the rate of pay of workers, both union and non-union. Our rate of pay is probably greater than it would have been had there been no union activities in this market. The extent to which these activities increase the rate only but decrease the amount of available work and consequently the total pay is unknown, but undoubtedly the tendency of increased costs is toward decreased use.

It is probable in industries of this character the vertical type of union will be more workable. This does not necessarily mean organization under the C. I. O., as is usually believed. The employees of crushed-stone plants in our area who are organized belong to a vertical union which is chartered by the A. F. of L. and comes under the Building Laborers' group. This arrangement has the advantage of being recognized by the crafts who generally use our materials, and has so far seemed to work without particular disadvantage to the more skilled workmen, such as shovel runners.

Undoubtedly management should have a keen interest in the economic situation of those employed. I doubt if this can be accomplished by law, as we have made altogether too little progress in the direction of "planned economy" to accomplish much by law. In order to do this it will require a great amount of time for raising the general level of understanding by the people in these matters. It will require on the part of many a much greater knowledge of facts and their application to economic theory, and it probably can not be accomplished without the development in this country of some form of authoritarian government, which is to-day hardly consistent with our democratic tradition. I doubt if the people of this country will very soon be ready to accept the discipline and the loss of individual liberty which this implies. It is not yet possible to require or deliberately plan for the payment of some arbitrary standard of yearly living expense. Such a standard is not yet understood and has not been determined. It will necessarily be subject to the widest variations throughout the country, to the same extent that living conditions vary widely.

While I believe planned economy is a desirable objective for the future and we can do much to hasten its accomplishment, we have not yet raised the general level of understanding to a point where it can be made effective. Under present conditions these efforts usually result in attaining better conditions for some group at the expense of many others, as in the case of the steel workers, and consequently are open to the inevitable result that they will, in those groups, reduce employment. The present position of the railroads illustrates the situation.

Within limits and as a bottom it may be possible to set up minimum rates of pay and maximum hours. In my opinion the latter can not be established as a means of distributing the the work without damaging our whole economy. Its only effect can be further to raise the pay of the individual for the time actually worked and become an incentive to a more uniform rate of employment. If we could furnish employment uniformly throughout the year it would undoubtedly be desirable. I believe all progressive management in these industries is working toward that end. It is, however, practically unattainable in such a seasonal industry as construction. The difficulties resulting from seasonal unemployment will have to be met in some other manner.

Technological advance is going to continue. It can result in either an increase of leisure or unemployment, or in an advance of the living standards of the country. Leisure and unemployment are different only as the economic position of those enjoying it is different. Surveys by the Brookings Institution do not suggest that we have yet reached the point where we can translate much of this advance into leisure with large groups with unfilled wants still existing. Our situation still suggests the need of more goods and better distribution rather than more

leisure, even though the distribution were perfect. Undoubtedly the past over a long period has produced more leisure and a better standard of living. I believe our democracy is capable of producing a much better condition, both as to leisure and a better standard, but I feel that we must be content, if we are to make real progress, in making this progress gradually. This need for time is not due to our lack of technical ability, but more to the rate at which the large majority of people can accomodate themselves to changes in their habit pattern, both as to their activities and their thinking. More than anything else we need time, and I believe the next ten years will determine whether or not an adequate amount of time is to be available.
(*Gravel*)

* * *

I think it quite likely that the men working for us will slowly ask for unionization. It is my own opinion such action would not benefit them in the least and would not therefore improve their economic status.

Everything else being equal I would prefer a vertical-type union; however, our sheet-metal workers are now members of a craft union and we get along all right with them. The only difference is that it takes considerably more time to deal with so many crafts, but it may well be that it is time exceedingly well spent under present conditions. I can not even make a good guess at to which may win out —Lewis or Green.

If I could arrange to overcome the seasonal trend of our business and have steady employment for our men it certainly would be very desirable from every standpoint, but just as long as people push construction and maintenance during the season when it can best be done we will continue to have this problem with us in my opinion.

I am sure that we should all be interested in the economic situation of our workers, but I do not think it possible to legislate good morals into any group and any attempt to do so will lead to just another N. R. A. situation and the rapid development of another crop of chiselers to prey upon legitimate industry.

Better living conditions are to be desired; however, it is not so much a matter of regulation as it is of education.
(*Crushed Stone*)

Guntersville

(*from page 36*)

¾-in., pea gravel from ¾-in. to 4-mesh. This double screening of the gravel has the effect of producing three very clean well-graded products. Whatever sand and water passes the dewatering screens is removed by the bottom decks and enters the sand flume.

Classification of the sand is accomplished in two stages. The entire load of sand and water is flumed to two 8-ft. Wood Auto-Vortex classifiers designed to split on the 30-mesh. The overflow from these machines passes directly to the fine settling tank, which was especially designed and built by the American Aggregates Corp. This settling tank is equipped with three rows of collecting and classifying pockets from which the fine sand is drawn. The product from these spigots is discharged to a sump, from which it is pumped through a trash remover and passes by gravity to the fine-sand barge.

The sand drawn from the Wood classifiers passes into a tank, where water is added to facilitate pumping, the proper water level being maintained by an ingenious float valve which draws water from the waste supply. The sand is pumped from this collecting tank by three 4-in. sand pumps built by the Georgia Iron Works, which feed three Tyler vibrating screens, which complete the separation of the sand into the two sizes, 30-mesh down and 30-mesh to No. 4 mesh. The oversize from these Tyler screens passes to a conveyor belt which delivers it into a barge. The 30-mesh down sand and water from the Tyler screens passes to the special settling tank for the fine sand, where it joins the fine sand and water from the classifiers. The water currents in the especially designed fine-sand settling tank are so maintained as to allow the settling of the 100-mesh sand and at the same time prevent the settling of silt and clay. Provisions are also made for regulating the percentage of minus 100-mesh in the fine sand and a reasonable regulation of the percentage of each size making up the 30-mesh down sand can be maintained. Two exceptionally good products are thus obtained; the coarse sand being well graded from 4-mesh to 30-mesh, the fine sand being well graded from 30-mesh to 100-mesh. The set-up of classifiers, screens and settling tank allows positive mechanical control over both products to meet varying conditions in the river deposits.

Barges are handled alongside the plant by means of two power winches and the loading is accomplished by means of four 24-in. belt-conveyors overhanging the plant on booms which may be taken in when moving the plant any great distance. The fine sand, as mentioned before, is loaded by gravity.

Three steel spuds are in use. One is located at the up-stream end of the hull and serves in conjunction with two anchor lines to hold the plant and necessary barges around for loading. The other two spuds are for leveling the hull and are located on each side near the stern.

The Tennessee Valley Sand & Gravel Co. of Sheffield, Ala., handles the towing of materials to the T. V. A. unloading dock and the placing of barges for loading at the plant. The steamer, Rita, and 12 barges have been handling this part of the job.

The contract, totaling about 550,000 tons of aggregates, is being handled efficiently and will be completed this autumn. Officials of the T. V. A. and especially those in charge of construction at Guntersville Dam seem highly pleased with the service rendered and the products furnished under the contract.

The writer of this article is in no way connected with the American Aggregates Corp., but instead has been connected with the engineering department of a large competing aggregates-producing concern during the past nine years. The privilege of carefully analyzing the assembly and operation, also writing this article, was granted the writer by the American Aggregates Corp.

In the opinion of the writer the floating aggregates-producing plant represents a radical departure from previous methods and embraces a new and unique assembly of working parts such as the suction dredge, the sand classifiers and special sand-settling tanks, the Tyler screens, and the centrifugal pumps, all so arranged and used as to result in the satisfactory production of exacting specification materials at a low cost.

On the dredge Goodyear suction hose and dredge sleeves are used, and Goodyear conveyor belting is used in the floating screening plant. All V-belt drives are Allis-Chalmers Texrope and the hoists were furnished by the Greenville Mfg. Works.

Extensive Changes Being Made to Silica Plant

The Century Silica Co., F. Wilson, vice-president, Emlenton, Pa., will modernize its sand plant in Clarion County, Pa., located between Emlenton and Foxburg. It will construct several new buildings, use the glory hole system of drilling, and install much new equipment. Total cost estimated at $250,000.

Carolina

(from page 40

Safety Council and buys all the posters suitable for this industry. Mr. Shaw is in charge of safety work at all the plants.

Each man working on the quarry face, in the crusher pit, or in other places where there is danger from falling material, wears a Davis Emergency Equipment Co. hard hat and hard-toe safety shoes. All the employees, including the superintendent, wear American Optical Co. spectacle-type safety glasses, either clear or dark as preferred. The quarry workers

Trailer full of stone being dumped into primary crusher.

Another view of dumping operation with air hoist at right.

wear glasses with ventilated side screens for maximum protection. This equipment is sold by the company to its employees at wholesale cost. In all its plants a total of $7,000 worth of shoes and 1,000 pairs of glasses were sold in 1936.

In the quarry old boilers with benches inside are located at suitable points as "dog-houses" for the protection of the workers during blasts. All the electrical equipment in the plant and quarry is grounded. Current at 440 v. is supplied to the shovel through an insulated cable and the shovel is grounded outside the quarry through a rubber-insulated independent ground wire running parallel with this cable. Men handling this cable wear rubber boots and linemen's rubber gloves.

All the equipment is controlled by oil switches of a type which automatically cuts off the current at 175 deg. F. At each point where there is fire danger there is a carbon-tetrachloride type of fire extinguisher. This type is preferred because the liquid will not freeze and because its nonconductivity eliminates any electrical hazard.

Capital

(from page 38

gomery, Ward & Co., than they could to other retailers.

The Biddle Purchasing Co., New York, largest food brokerage firm in the country, was ordered to cease and desist sharing the discounts between seller and buyer. The Biddle company is appealing the case, the appeal acting as a stay of the order. It is the purpose of the brokers to take the case to the Supreme Court. The Hollywood Hat Co., New York, is ordered to cease and desist from giving more generous terms to one wholesale customer than to another.

The citation of the 77 cement concerns for multiple-basing point practices in restraint of trade and competition is reported to be a forerunner of a drive to smash other monopolies, including, it is said, the steel, food, fertilizer, and tobacco companies.

Representative Jennings Randolph, West Virginia, one of the assistant whips in the House, is the author of a bill, H. R. 1536, "to aid and promote scientific research of a basic character upon which the inception and development of new industries or the expansion of established industries may be dependent". At a recent hearing in committee it was brought out by a number of representatives of scientific institutions, and by inventors from all parts of the country, that it is hoped this bill may help to evolve an invention as profound in its effect upon industry as was the automobile, the photographic art, and other basic inventions. It provides for the creation of a Scientific Research Commission, financed by the government, whose function it shall be to aid persons with worthy plans or inventions. The commission is to operate appropriate laboratories, develop the plans or inventions, exercise full control over them, and after they have been marketed, reimburse the government for its outlay, and then under appropriate conditions return the property as a "going concern" to the inventor-owner. Representative Randolph believes that this enterprise will eventually create large industries that will absorb the services of vast numbers of unemployed. To make work is the main purpose of the proposed law. Contrariwise, the Natural Resources Commission warns the President against more machinery.

The Federal Trade Commission reports that foreign trade associations, operating under the Webb-Pomerene Act, shipped over $40,000,000 worth of nonmetallic minerals abroad during the past year. A let down of trade restrictions, and more vigorous competition by American concerns in foreign markets, are given credit for the increased export business. A business operating under the Webb-Pomerene Act must engage solely in export trade, must not restrain the trade of a competitor, must not trade unfairly, nor must it enhance or depress prices in the United States. There are now forty-five such associations in the United States.

"The Administration has almost completely reversed its policy with reference to the anti-trust laws", says Executive Secretary Vincent P. Ahearn of the National Sand & Gravel Assn. "In 1933 these laws were not permitted to stand in the way of enactment of the National Recovery Act, and it was generally considered that Mr. Roosevelt did not object to industry being relieved from the anti-trust laws, if certain labor regulations were accepted by industry. It is significant that one of the changes in the Black Bill from the original proposal was that the following clause was stricken from the preamble: 'causes undue price fluctuations impairing the stability of prices in interstate commerce'. This demonstrates how eager the Administration is to remove any suggestion that it is interested in price stability under the law."

Mica Production Up

The domestic production of sheet and scrap mica increased in 1936 to 21,615 short tons valued at $464,473 from 19,320 tons valued at $405,101 in 1935, according to reports furnished to the Bureau of Mines by producers and consumers of mica. The increase in tonnage was largely the result of further improvement in demand for ground mica for roofing purposes but production of all kinds of mica increased in the United States and imports increased greatly, reflecting active demand in practically all branches of the consuming industries. The improvement in demand was world-wide, owing to general industrial revival and also to the fact that a good deal of mica evidently went into war materials or simply was stocked in European countries as a guaranty against the contingency of war. Condensers, airplane spark plugs, and other vital parts for modern communication and transportation equipment are large consumers of mica.

P AND Q
PROFITABLE
New Products
SECTION

Exterior (left) and interior of the office of a modern tourist court at Silver Springs, Fla., built entirely of lime-rock concrete. Even the flagpole, flower pots, key rack and stairway are made of this material.

Lime-Rock Concrete Used in Florida Construction

THE soft lime-rock found in Florida and in southern Georgia has been used for many years in highway construction. Mixed with sand it is ideal for secondary roads where traffic is light and on main highways has been used successfully with a sealing or wear-resisting top course. Until a few years ago, however, not even the producers of this material considered it a proper aggregate for concrete. Since its suitability for this purpose has been demonstrated a growing demand has developed.

The Dixie Lime Products Co., which operates several plants near Ocala, Fla., has been to a large extent responsible for this development and has been active in its promotion. The P.W.A. officials in this territory were quick to see the advantages of this new concrete aggregate and in the last two years have used it in new school buildings, auditoriums and other public buildings. Among these are a new exhibition building at Orlando, Fla., which is 125-ft. square and has a wide-span roof; a high school at Groveland, Fla.; an abattoir and farmers' market at Ocala. Its use in private building construction is also increasing. At Williston, Fla., a bank and garage have been built of lime-rock concrete and its use in home building is growing.

Probably the most interesting application of this new concrete aggregate is in the new administration building of the Silver Springs Tourist Court at Silver Springs, Fla. These springs are world-famous for their beauty and size and this building is distinctly an added attraction. From foundation to roof it is made of lime-rock concrete. Floors, walls, sidewalks and roof are all made of this material. Even the flagpole, the artistic porch supports and the large pots for decorative trees were poured of lime-rock concrete in special forms. Also made in this manner were the key rack at the room-clerk's desk and a spiral staircase of cantilever construction.

Lime-rock concrete has also been used successfully in sidewalks, curbs and gutters and tests of its suitability for highways are being made. In highways the slab of concrete is first poured and before it sets flint chats are spread over and embedded in the surface of the slab, forming a wear-resisting pavement. In building floors and in sidewalks a sanded surface grout is used to resist abrasion.

The lime-rock used is a very pure material containing no clay, very little iron and some silica. The run-of-mine product has a guaranteed calcium content of 97 per cent. and selected material contains over 99 per cent. Its naturally high cementing value makes it possible to use a 7 to 1 mixture with a comparatively high percentage of fine material. Architects favor lime-rock concrete because of its workability and because of its low coëfficient of expansion which makes roof expansion joints unnecessary.

A house built of lime-rock concrete costs only about 10 per cent. more than a wooden house of similar size. It is fireproof, vermin- and termite-proof, is cooler in summer, and lends itself readily to air-conditioning. Plaster can be applied direct on this concrete.

The abattoir at Ocala, Fla. This building and an adjoining farmers' market were built entirely of lime-rock concrete.

BY W. E. TRAUFFER

Florida Rock Producer Finds Concrete Brick a Profitable Outlet for Waste Screenings

ONE of the leading exponents of the advantages of side-lines to an aggregate producer is the Consolidated Rock Products Co. which operates one of the largest aggregate plants in the southeast near Brooksville, Fla. A complete description of this plant was published in the January 27, 1932 issue of PIT AND QUARRY.

This company is a division of the McDonald Corp., large grove and real estate operator in Florida. This corporation, headed by William P. McDonald, also controls the Macasphalt Corp., which operates commercial ag-

Operator transferring bricks from machine to rack car.

gregate-bituminizing plants all over the United States and Canada. One such plant is now in operation at Brandon, near Tampa, Fla.

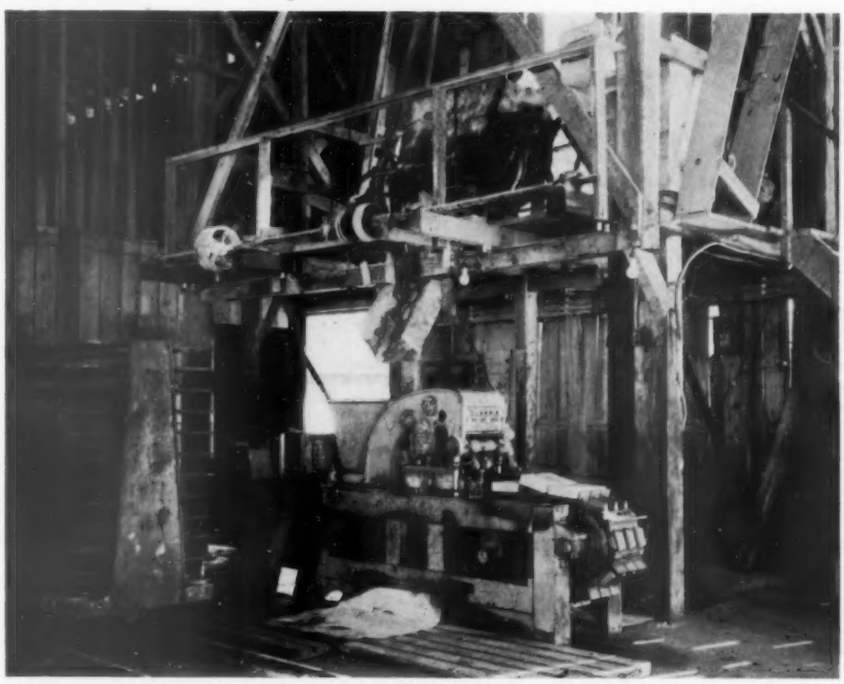
The rock plant at Brooksville, known as the Conrock plant, was built in 1936 and has a production of 150,000 tons annually. The deposit is a lime rock considerably harder than that found in the Ocala district and will pass all government and state specifications for concrete rock. Much of the fine material produced is sold to groves, and excess screenings are used in the company's concrete brick and block plant. Two years ago the locomotives and cars used for quarry haulage were replaced by 7-ton Mack trucks. According to A. M. Luttrell, plant superintendent, these trucks have greater flexibility and make possible the selection in the quarry of rock suited to the existing needs.

The company originally rented space on its property and sold aggregates to another company which manufactured concrete pipe. When this company went out of business the rock company installed a Dunbrik machine which went into operation on August 28, 1935. The mixer and skip hoist used in the pipe plant now serve this brick machine.

The screenings and sand are dumped on piles from trucks and are then loaded by hand shoveling into 1-cu. ft. measuring boxes which are dumped into a skip bucket. This bucket dumps these materials into a 1-cu. yd. Blystone mixer. The mix being used is composed of 1 part of cement, 4 parts of local sand, and 6 parts of screenings.

A side view of brick machine, which shows its simplicity and compactness.

The concrete brick machine is the standard Dunbrik and Dunstone machine made by the W. E. Dunn Mfg. Co. This machine can produce standard size brick and multiple brick. Double and triple blocks can also be made. In 10-hr. of actual operation 15,900 bricks have been produced with this machine, and 5,000 triple blocks have been made in the same period.



The brick machine with concrete mixer above and one of rack cars at left.

This view of yard shows some of the reserve supply of bricks and blocks kept on hand.

The concrete brick and block plant with portable loading conveyor in foreground.

The bricks are transferred from the machine as they are made to metal racks on cars. After lying one day on these racks the bricks are unloaded into piles outdoors, where they are sprayed continuously for 30 days before they are allowed to be shipped. Each of the rack cars holds 1,008 bricks and runs on narrow-gage tracks. A turntable at the brick machine makes it possible to load first one side of a rack and then turn the car around and load the other side. The loaded rack car is then run on a transfer car which serves 8 tracks in the storage yard.

Seasoned bricks are loaded from storage on flat cars which hold 1,000 bricks each. The flat cars are run on the transfer cars to a point near the railroad siding serving the plant. Here the bricks are transferred by hand on a 50-ft. Barber-Greene portable belt-conveyor driven by a Le Roi gasoline engine. This conveyor loads them into either cars or trucks, where they are stacked by hand. A total of 30,000 bricks have been loaded in a 10-hr. day using this system. Most of the bricks sold are used in private building construction within a 40-mi. radius of the plant and in the city of Tampa.

There is some demand for colored brick and this is made by piling up the seasoned bricks and coloring them by the use of a Dunn pressure sprayer. Special speckled surfaces are also made. For these bricks the desired color mixed with cement is first sprayed on and before it sets fine colored roofing granules are sprayed on. The spraying machine has two compartments, one for color and one for granules.

The company's policy is to keep an adequate supply on hand to meet any possible demand. At the time the writer visited this plant there were 700,000 single bricks, and some double and triple tiles on hand.

Only 6 men and a foreman are required to operate this plant at capacity. These men also find time to make some reinforced-concrete fence posts for the state highway department. These are made by hand in forms.

Bentonite Output Grows as New Uses Develop

The production of bentonite and certain other fine-grained clays in 1936 increased to 291,625 short tons valued at $1,567,181, as shown by the annual returns of producers to the Bureau of Mines. Originally called "taylorite" but renamed later after the Benton formation in Wyoming where the type material occurs, this unusual clay was first mined a half century ago and was well known to mineralogists following its description by W. C. Knight in 1897. Its properties promptly attracted a good deal of interest but commercial developments lagged until about 15 years ago. As recently as 1928 when the Bureau of Mines published a technical paper on bentonite, domestic production probably did not exceed 40,000 tons a year. In 1930 it jumped to 107,405 tons valued at $858,927 and, after a brief set-back due to the general depression, began increasing again in 1933.

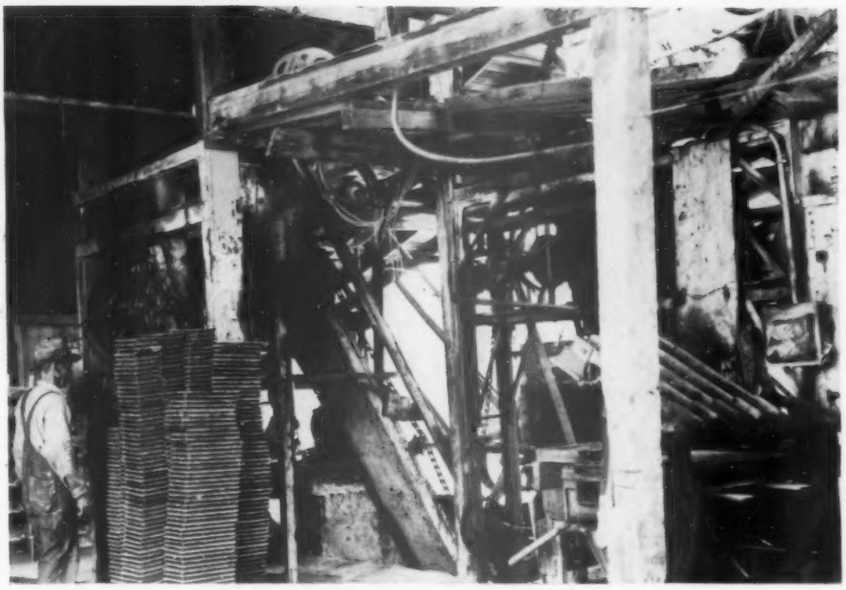
Bentonites are "soapy" clays composed of weathered and altered volcanic ash. They are characterized by an extraordinary capacity for taking up many times their own volume of water and by their colloidal or jelly-like behavior when wet. Their chief use is in muds for rotary drilling, to maintain suspensions and to maintain a seal, but their thickening and suspending properties are utilized in many other industries and substantial quantities are employed in foundries for rejuvenating molding sands and as a core wash. Most of the artificially "activated" earths employed for bleaching oils are acid-treated bentonites. Another use of great practical importance, though not constituting a regular outlet for much tonnage, is for sealing dams and for cutting off the flow of water through pervious gravels and seamy rock into mines and other excavations. Bentonite was recently used to plug a leak in one of the cofferdams being used in the construction of Coulee Dam in Washington after all other methods had failed. Failure to stop this leak effectively and quickly would have resulted in a tremendous financial loss to the contractor. Increasing quantities of bentonite are used as binder for asbestos, mineral wool, and other products.

Probably the most typical bentonite is found near Belle Fourche, S. Dak., and in an adjoining area in eastern Wyoming although it occurs in at least a dozen states and commercial shipments were reported in 1936 from 8 states.

Native Calcium Chloride Sales, Production Gain

The production and sales for the year 1936 of calcium chloride and mixed calcium-magnesium chloride obtained directly from natural brines represent a considerable increase over previous records; being 125,911 short tons, valued at $1,909,908, or an increase of 50 per cent. in quantity and 85 per cent. in value over similar figures for 1935, according to the U. S. Bureau of Mines. In addition to these sales, large quantities are obtained as a by-product of soda ash in the Solvay process—the chloride in such case being derived from brine or rock salt, but the calcium coming from limestone.

In 1936 the average value of the production reported to the Bureau of Mines was $15.17 per ton f.o.b. plant. Delivered at consuming points, flake chloride in that year cost, in carload quantities (minimum, 22½ tons), from $19 to $35 a ton, averaging perhaps $23 a ton; solid calcium chloride was quoted at $2 a ton less than flake; liquid was quoted at $7.50 a ton f.o.b. works or about $2 a ton cheaper than the equivalent amount of flake chloride.



Interior view of the Turner Gravel Co. concrete-products plant.

BY D. R. (Spec) COLLINS

GRAVEL OPERATOR MAKES PRODUCTS PAY

WHENEVER someone mentions the value of diversification and the addition of new products to the aggregates business, I always think of the Turner Gravel Co. of San Antonio, Tex., as an outstanding example of how such additions have yielded a profit. A picture of that plant is one of a plant turning out many kinds of products—all allied—and, by so doing, getting a greater share of the customer's dollar. A look behind the scenes at Turner's operations will show that they are all closely coördinated, that the same salesman can sell all his products at the same call, that the sale of one product invariably builds the way for the sale of another. You will find Arch Turner a shrewd business man whose additions to his original sand-and-gravel business all have rhyme and reason. At no time has he walked blindfolded off the deep end. On the contrary, he has dived only with the full knowledge of the depth and temperature of the water and of his own capabilities as a swimmer. He has been conservative in his operations and, because of that conservatism and knowing his markets, has been able to make them pay.

No one knows better than Arch Turner of San Antonio that the sand-and-gravel business changes overnight like any other business. Mr. Turner turned over his roofing business about twenty years ago to his brother to form the Turner Gravel Co. In those days carload shipments for hundreds of miles around San Antonio were every-day stuff that he took in his stride. Then came the small producers in surrounding towns to knock out the carload business. Later small producers sprang up almost overnight in San Antonio. Faced with meeting irresponsible competitors, Arch Turner stepped into the transit-mixed concrete business.

Now Mr. Turner has added and is pushing concrete tile and other concrete products in order to round out his line and offer a more complete service to the building trade. In this way Mr. Turner feels that his firm can have much to say as to the design of firesafe structures and in this manner keep sub-bids from being raised too high—a practice which in many cases would throw the job back to non-firesafe construction.

Concrete-products operations conducted in the Turner plant are, like his other operations, on a conservative basis. Turner does not make concrete block. Instead, he manufactures a 5-in. by 8-in. by 12-in. concrete tile, which is as standard a masonry unit in his part of the country as the regular 8-in. by 8-in. by 16-in. block is in most sections.

His equipment consists of one power tamper making the Ideal type of two-core tile which combines lightness of weight with unusual strength and stability. He has a Kramer brick power tamper used exclusively in the production of concrete bricks. These machines are fitted with an Ideal and a Besser mixer, each of the batch type.

The plant is laid out very simply. The mixers are directly in front of the machines with adequate aggregate storage directly behind them. As quickly as the units are manufactured they are wheeled into a room adequately heated and containing fog sprays. They are kept in these fog rooms for 24 hr., after which they are wheeled

BEFORE—Unsafe, unsanitary fire traps condemned by the city of San Antonio.

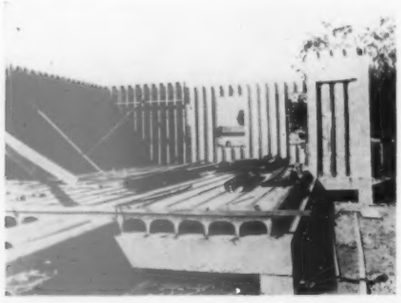
AFTER—Turner products built these modern fireproof dwelling units.

Concrete tiles in the Turner storage yard are sprinkled for 7 days and covered with tarpaulins during the curing period.

into the yard, stacked and sprinkled continuously for 7 days. So that the units will not dry out too quickly during this curing process, huge tarpaulins are used to cover the piles of products.

Turner's operations are all on a quality basis. His aggregate storage directly behind his mixers is in Butler bins with proper scales to proportion accurately every batch as it goes into the mixer. Water as well as aggregate is also measured by means of a gage on the water tank.

Arch Turner is an aggressive merchandizer. He does a moderate amount



Metal arched forms for concrete walls and floors.

of advertising to keep the public acquainted with his product and believes that personal salesmanship is the best key to success in the merchandising of his allied lines. Last year he marketed over 200,000 5-in. by 8-in. by 12-in. tiles and over 250,000 concrete bricks, all at a good price and all, of course, utilizing the aggregate which his gravel company produces. Certainly the profits from these units went a long way toward taking care of Turner's overhead during that period.

In addition to sand and gravel the Turner company sells the following products: transit-mixed concrete — which accounts for the bulk of his business; Portland-cement stucco, Portland-cement waterproofing, lime, metal lath, plaster and other building materials that might fit in to make his line well rounded and that can go into the majority of jobs that he sells.

From this one can readily see that the Turner company has an advantage most aggregate producers do not possess. He can sell a driveway and pavement job and at the same time furnish materials for office buildings from the footings to the roof. Turner has also taken over a unique system of collapsible floor forms for low-cost floors for which he furnishes ready-mixed concrete. For walls he has his 5-in. by 8-in. by 12 in. concrete units but should the customer prefer monolithic walls, he immediately up-ends the same forms he uses for the floors and adapts them for a ribbed system of walls for which he can again furnish ready-mixed concrete. But Turner does not need to stop even there, for these same metal forms can also be used for flat-roof construction. But if people do not want this type of roof, he has a line of precast concrete slabs that he can sell them.

Other concrete products he manufactures are lintels, sills and concrete joists. Turner feels that the concrete joist has opened an entirely new and favorable market for him inasmuch as floors employing these joists utilize ready-mixed concrete. He has found the fact that he sells joists a distinct asset as a business-getter.

An example of how this set-up creates a job is a private slum-clearance project in San Antonio. The first units of this project have been completed. The Southland Life Co. has considerable property in San Antonio covered with shacks rented to Mexicans. These shacks had been condemned by the city. It was a case of clearing them out altogether for the Southland or constructing new low-rental buildings. Arch Turner was able to show them how small concrete-masonry apartments could be built at low cost. In addition, the low up-keep and fire-safety factors were convincing arguments that got the job under way. Mr. Shepherd, who handles the products sales for Turner, set in with the Southland on the design of the apartments. Shepherd lined up competent contractors and by controlling the major portions of the materials going into the structure he was able to keep the project at real low cost. The Turner Gravel Co. furnished the ready-mixed concrete for all the foundations, steps and floors. It furnished the concrete tiles for the walls, the cement paint and the plaster. The precast roof slabs were another Turner product. The amount of wood or other materials that went into these apartments was so small as not to affect the cost one way or another, leaving the entire project practically in the hands of the Turner company. Mr. Turner is working on other property owners in the slum areas for similar projects. Fire-safe residences and small commercial builders will be developed in the same way.

Slate Sales In 1936

The slate sold at quarries in the United States in 1936 amounted to 452,400 short tons valued at $5,485,-208, according to figures compiled by the U. S. Bureau of Mines.

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Salt Production Sets Record in 1936

Salt mines, wells, and ponds in the United States yielded a record-breaking total of 8,828,936 short tons of salt valued at $23,306,177 in 1936, states the U. S. Bureau of Mines. This was an increase of 11 per cent. in quantity compared with the preceding year and over half again as much as was sold or used in 1932 when the depression was at its worst.

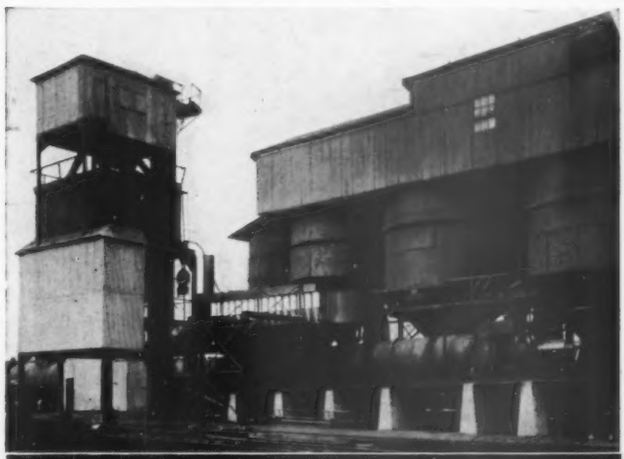
The best known uses of salt are for savoring and preserving food, but consumption in the food industries changes little from year to year. The ups and downs of the salt industry are caused principally by fluctuations in demands for chlorine, soda and other important chemical raw materials that are made from salt. Few minerals play so varied a role in our everyday life, yet salt seldom gets credit for the services it renders away from the dining table where relatively insignificant quantities actually are consumed. Approximately half of the salt produced loses its identity as salt before it is extracted from the brine in which it flows from the ground. The average American uses about 6 lb. of salt a year as condiment and probably not more than 6 lb. additional is used annually in the preparation or preservation of his share of foodstuffs, nevertheless the per capita consumption of salt in the United States in 1936 was 69 lb.

The average value of all salt in 1936, $2.64 a short ton, was 11 cents less than in 1935; that of evaporated salt, including pressed blocks from evaporated salt, was $6.14, 20 cents less than in 1935; and that of rock salt was $2.99, 14 cents less than in 1935.

TO remove the sand lying above its silica deposits the Ottawa Silica Co., Ottawa, Ill., has bought a LeTourneau U-12 Carryall scraper and an Angledozer for use with a Caterpillar RD8 tractor.

This company's silica sand is used in quick-setting cement, fine glassware and other products requiring a high grade of silica, and great care is taken to strip closely and accurately; good cable control makes it possible for the scraper to cut to a fraction of an inch.

The Angledozer and scraper in combination are used to dump overburden into an abandoned pit. The scraper dumps alongside the pit edge, then on the next trip around the Angledozer pushes the previously dumped load into the pit. This does away with the necessity of an extra tractor.



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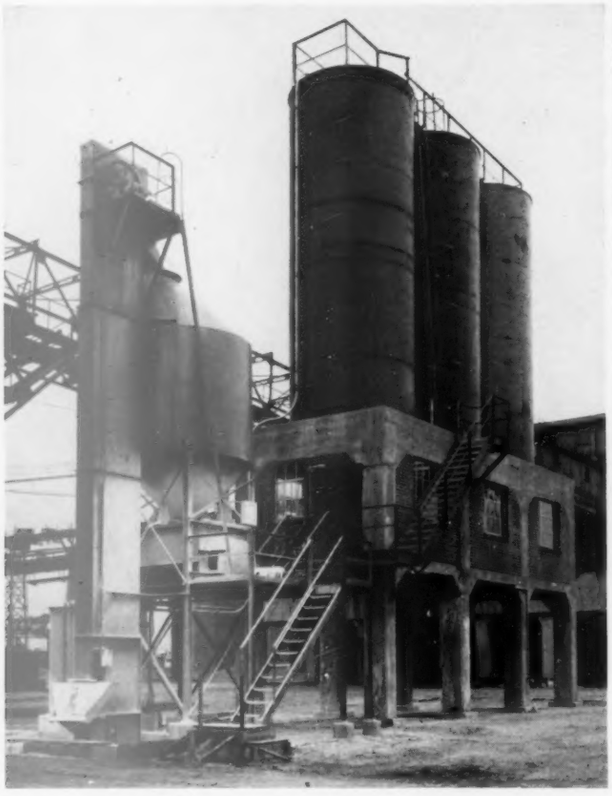

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Birmingham.....1503 N. Fiftieth St.
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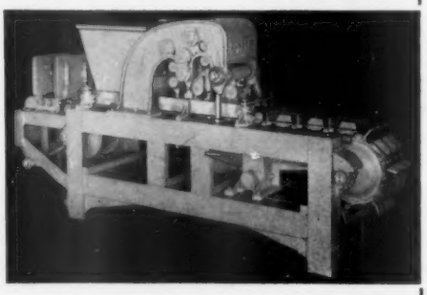

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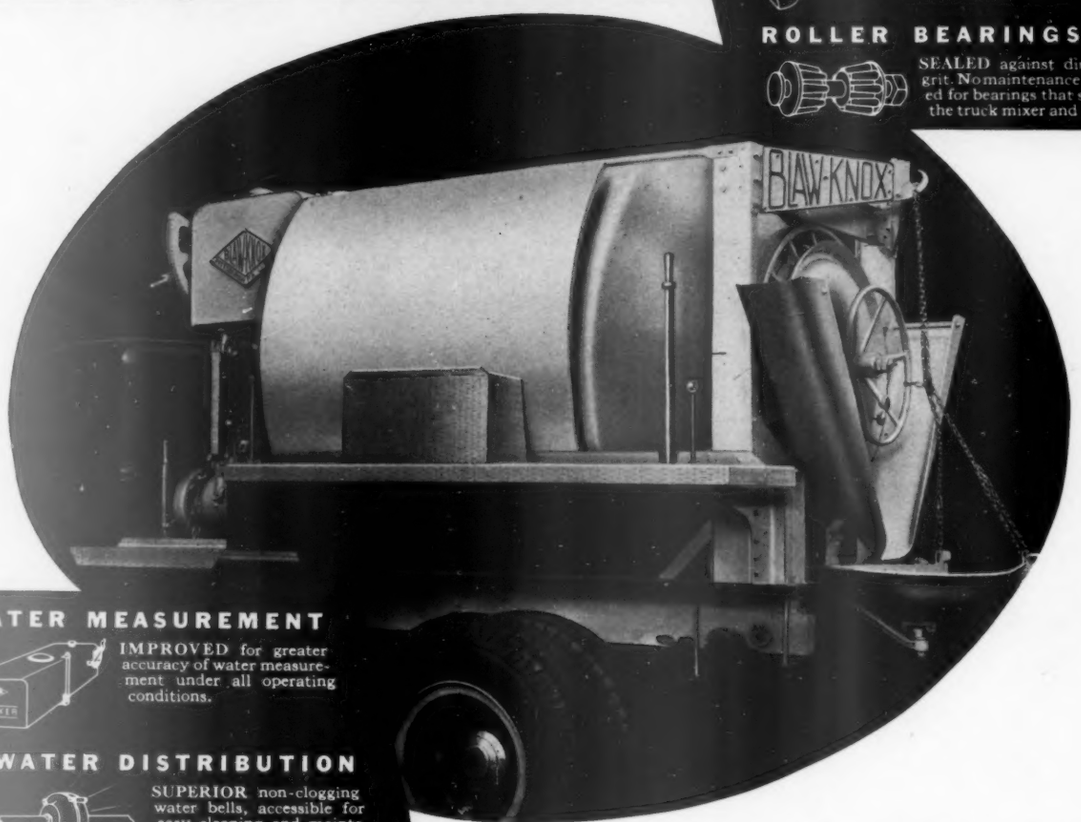

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DEEPER blades of unusual design for faster and more thorough mixing action.

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ACCESSIBLE for filling. Located on cat-walk, reducing fire hazard.

You get all of these advantages at no extra cost when you buy Blaw-Knox TRUKMIXERS and Agitators.

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L. C. NEWLANDS
President
Oregon Portland Cement Co.

MEN · OF · THE · INDUSTRY

Early this year Mr. Newlands was made president of the Oregon Portland Cement Co., after having served as its vice-president and general manager since 1915. Before joining the Oregon company he was superintendent of the Vancouver Portland Cement Co., having assumed that position in 1907. He attended Queen's University at Kingston, Ont., graduating as a mining engineer. During his 30 years in the cement industry he has been interested and active in the welfare of the industry as a whole through membership in the Portland Cement Assn. His home is in Oswego, Ore., within short commuting distance from his offices in Portland.

Personal Mention

WILLIAM LEAKE has been appointed assistant superintendent of the Brixment mills and quarries of the Louisville Cement Co. at Speed, Ind., succeeding the late John M. Buchheit. Mr. Leake is a native of Indiana, graduate of Rose Polytechnic of Terre Haute, Ind., and was for a number of years with the Indiana Highway Department. He is 30 years old. He has been in the employ of the Louisville company since January 1 this year as plant engineer.

O. W. THALEG, well known in the crushing industry, has been named Chicago representative of the Traylor Engineering & Mfg. Co. Offices of the Chicago branch are maintained at 1 N. LaSalle St.

J. P. LORENZEN has resigned from the development department of the Portland Cement Assn., to take up other work for the National Safety Council, Chicago, Ill.

J. W. LEWIS of the cement-products bureau of the Portland Cement Assn. has resigned after 4 years of contractor contact work in the promotion of concrete houses, to become Chicago representative and manager of the American Concrete Corp. post plant at 4727 N. Lamon Ave., Chicago, which is now being backed by an Ohio firm.

ROBERT S. WAIT, Syracuse, N. Y., for the past six years central New York representative of the Portland Cement Assn., has become associated with Wait Associates, consulting engineers and advisors on highway materials. The firm is headed by Bertrand H. Wait.

"RUSTY" KNUDTSON, salesman of the Tractor & Equipment Co., Chicago, Ill., who formerly made his headquarters in DeKalb, Ill., has been transferred to the Chicago office, to specialize in the sale of industrial plant equipment.

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protection from the ravages of wear in vital moving parts — because GREDAG resists the high temperature of friction, the congealing action of cold, and the rupturing effect of pressure. Read why GREDAG "stands up" where ordinary greases fail, as told in our 52-page LUBRICATION MANUAL No. 37. Your copy sent on request. "Known the World Over"

Check the deterioration of your equipment at the source by keeping all contact surfaces well lubricated with GREDAG — the 100% lubrication for outdoor machinery. GREDAG gives definitely longer

"KNOWN THE WORLD OVER"

THE GREDAG CORP.

NIAGARA FALLS, N. Y.

A. C. CRONKRITE has been elected vice-president of Universal Atlas Cement Co. He started his career with the company in 1907 as a salesman, was appointed metropolitan sale manager for Chicago in 1915 and since 1928 has been assistant general sales manager. In his new position as vice-president he will have charge of sales in the middle western area.

PAUL F. KEATING, who also has a long service record with the company, has been made assistant to the vice-president. Other regional vice-presidents whose elections are announced are A. O. STARK, in the east and O. H. D. ROHWER in the west.

P. N. BUSHNELL of the accident prevention and insurance bureau of the Portland Cement Assn. left the association's employ July 1 to become personnel and safety director of the Missouri Portland Cement Co.

LOUIS B. NEUMILLER, former manager of the central sales division of the Caterpillar Tractor Co., has been named director of industrial relations, a new post created because of growth of employment. Other important promotions announced in the Caterpillar organization are L. J. FLETCHER to assistant general sales manager, C. M. BURDETTE to manager of the central sales division, C. A. SPEARS to manager of allied equipment sales, MERWIN T. FARLEY to agricultural sales manager of the eastern division, and FLOYD E. RUSHER to assistant sales manager of the central division.

WALTER L. PENICK, formerly western manager for the Hardinge Co., has joined the Western Precipitation Corp. of Los Angeles. He will be field consultant on dust- and fume-control problems.

WILLIAM G. HULBERT, following his appointment as general works manager on May 1, has been elected vice-president of the Taylor-Wharton Iron and Steel Co., succeeding the late S. M. Buck. Mr. Hulbert continues his duties in charge of the manufacturing at both the High Bridge, N. J., and Easton, Pa. plants of the company.

IRVING M. FELT has been elected a director of The Lone Star Cement Corporation, formerly the International Cement Corporation, to fill a vacancy created by the death July 7 of Parmely W. Herrick.

ROBERT COLEMAN JR. and G. SAM MILAN qualified July 27 in Federal Court at Louisville as trustees for the Diamond Rock Asphalt Corp., Bowling Green, Ky., which has been operated under a receiver for the past few weeks.

MURRAY D. SHAFFER, Mansfield, O., civil engineer, who had been service-safety director of Mansfield for the past year, has resigned to accept a position with the Portland Cement Association.

C. W. GILMER, manager of mechanical sales, Seattle, Wash., branch of the mechanical goods division of the United States Rubber Products, Inc., has been transferred to the New York office as belting sales engineer, operating under T. A. Bennet, manager of belting sales. L. F. KOEPP, formerly salesman in the Seattle District, has been appointed manager of mechanical sales to take Mr. Gilmer's place in the Seattle branch.

H. F. BOE has been appointed commercial manager of the Westinghouse Electric & Mfg. Co., it is announced by N. G. Symonds, vice-president. Mr. Boe will have two headquarters, one in the Union Bank Building at Pittsburgh, the other at 150 Broadway, New York. In addition to being responsible for the sale of Westinghouse products in the Eastern district, Mr. Boe will now direct the commercial activtiies of the apparatus divisions. A native of Mansfield, O., Mr. Boe has been associated with Westinghouse since 1900.

H. A. BARBER was recently made a vice-president of Barber-Greene Co., Aurora, Illinois. Mr. Barber, who received his degree in mechanical engineering at the University of Illinois, has acquired both practical and technical experience in all phases of the Barber-Greene line. He has worked in virtually every department in the factory, and has done a great amount of service work in the field, particularly on B-G bituminous machines. His experience also includes research and engineering design. In his new position Mr. Barber will continue to assist his father, H. H. Barber, president of the company, in the supervision of engineering and manufacturing.

JOHN M. BUCHHEIT, 66 years old, pioneer quarryman and cement-mill operator and since 1911 superintendent of the Louisville Cement Co.'s natural-cement mills and quarries at Speed, Ind., was killed instantly in a motor accident near New Albany, Ind., on June 23. He was born Aug. 30, 1871, at Sellersburg, Ind., which was his home at the time of his death, and was employed by the Louisville Cement Co. in 1893; at the time of his death he had served 44 years continuously with that company. Having started as a poor boy he built his home in Sellersburg, and left an estate of approximating $25,000. He was a member of the Catholic Church at St. Joseph Hill, of the Silver Creek Lions Club at Sellersburg, and of the New Albany lodge, B.P.O.E. Elks. He was a Democrat in political faith and active in local politics.

ELMER W. CUMMINGS, 47, foreman of the Phenix Marble plant of the Independent Gravel Co. of Joplin, Mo., at Ash Grove, Mo., was killed recently when he fell under a moving car of crushed rock. He had been an employee of the company for a number of years, and had been at the Phenix plant 5 years.

RICHARD SCHLEGEL, 84, Allentown, Pa., who was in the sand business in West Bethlehem, Pa., for many years, died at his home recently. He retired from active business in 1915.

FRED PATEE, Casper, Wyo., civic leader and widely known in Wyoming for his aid in the development of the short fiber asbestos deposits on Casper Mountain, died at a Cheyenne, Wyo., hospital recently.

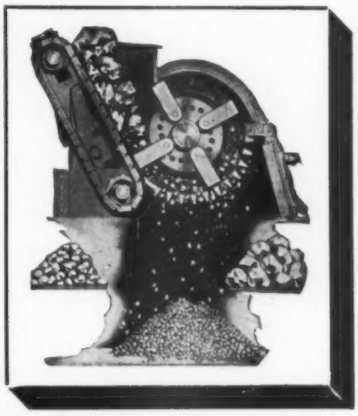
CHARLES L. SCHLATER, 78, veteran salesman for the woven-wire fabrics division of John A. Roebling's Sons Co., died June 29 at his home in Philadelphia, Pa., of a heart ailment.

JACOB H. SCHLUCHTER, retired president of the Rochester Sand & Brick Co., Detroit, Mich., passed away recently at his home in Detroit. Burial was in Manchester, Mich.

CLINTON H. MULLER, plant superintendent of the Crosby Sand & Gravel Co., Seattle, Wash., died at his home a short time ago after a brief illness.

CLIFFORD S. RANDALL, 71, treasurer of the Portland Monson Slate Co., Portland, Ore., died recently.

The Bucyrus-Erie Co., South Milwaukee, Wis. has re-appointed the Connelly Machinery Co., Billings, Mont. as its distributor for the state of Montana except the counties of Garfield, McCone, and Valley, and for that portion of Wyoming lying north of and including the counties of Teton, Park, Hot Springs, Washakie, Johnson, Campbell, Weston, and Yellowstone Park.



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A Review of Recent Books

BIG BUSINESS . . . ITS GROWTH AND ITS PLACE, *by Alfred L. Bernheim and associates. Published by Twentieth Century Fund, Inc., 330 W. 42d St., New York, N. Y. Price $1.35.*

The first of a contemplated series summarizing a study of what is commonly known as "big business." The object of this first volume has been to put big business in its proper place against the entire background of American economic life. The book is purely factual. While certain conclusions are drawn from the facts they are also factual. Economic judgments and suggestions for action have been rigidly excluded. The rise and extent of large corporations is traced and the concentration of wealth and income in the hands of the giant corporations is unfolded. It is pointed out, however, that such concentration can be effected and control exercised in ways not subject to statistical measurement such as interlocking directorates, investment trusts, trade associations and banking affiliations.

ROCK WOOL RESOURCES OF KANSAS, *by Norman Plummer. Bulletin of the University of Kansas, Vol. 38, No. 5, Mineral Resources Circular 5. 74 p.*

This booklet is a report of an investigation initiated as a project of the Kansas Geological Survey in the hope that it would lead to the establishment of a new mineral industry in Kansas. It shows the state's resources in raw materials suitable for making rock wool to be "practically unlimited"; some of the raw material is wool rock which can be mined, smelted and blown without the addition of any other rock, but most of the material must be mixed before the molten rock is blown. The report further considers such economic factors as availability of cheap fuel, transportation, and favorable marketing area.

ANALYSIS OF STATE UNEMPLOYMENT COMPENSATION LAWS, JANUARY 1, 1937, *by R. Gordon Wagenet. Social Security Board, Washington, D. C. For sale by the Superintendent of Documents, Washington, D. C. 23 p. 15c.*

This is a revision of a publication issued from time to time by the Social Security Board, analyzing and tabulating the most significant provisions of state unemployment compensation laws as interpreted by rules and regulations made by the state agencies administering them. It includes applicable provisions from other state labor laws, such as those dealing with public employment offices and the administration of labor legislation.

PHYSICAL PROPERTIES OF TYPICAL AMERICAN ROCKS, *by John H. Griffith, Iowa Engineering Experiment Station Bulletin 131. Published by Iowa State College, Ames, Ia. 56 p.*

This publication is, in a way, a sequel to Bulletin 128 in the same series, "Thermal Expansion of Typical American Rocks," published last year. The present publication gives the results of an investigation to determine relationships between physical properties of approximately 100 representative American rocks of varying chemical constitutions and diversified geographical locations.

KENTUCKY ROCK ASPHALT. SPECIFICATIONS AND DESIGNS FOR ITS MANY USES IN CONSTRUCTION AND MAINTENANCE. *Published by the Kentucky Rock Asphalt Institute, Louisville, Ky. 28 p.*

This well-illustrated booklet not only points out the advantages of Kentucky sandstone rock asphalt, but also is intended to serve as a general guide and instruction book for the proper use of this material.

ANNUAL REPORT FOR THE YEAR 1935, *Colorado Bureau of Mines, Denver, Colo. 77 p.*

In addition to useful statistical data on mining and quarrying activities during the year, this report contains some noteworthy statistical data on accidents and employment, and lists of operating mines classified by counties.

MINERAL RESOURCES OF KANSAS COUNTIES, *by Kenneth K. Landes. Bulletin of the University of Kansas, Vol. 38, No. 11, Mineral Resources Circular 6. 110 p.*

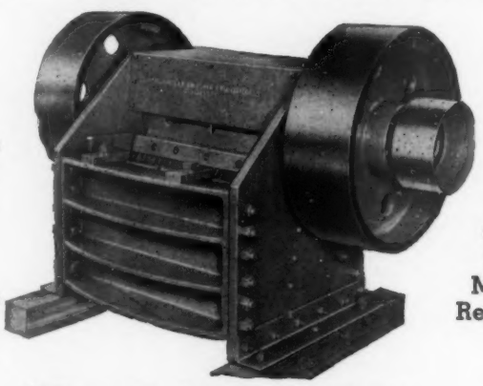
The relative importance of Kansas as a mineral-producing state is not often appreciated. Figured over a 5-year period this state ranks tenth in annual value of mineral products sold, outranking all of the famous mining states of the West except California, says the author of this report. The leading mineral products, in order of annual value, are petroleum, natural gas, coal, zinc, salt, stone, natural gasoline, sand and gravel, clay products, lead, gypsum, and volcanic ash. This survey of the state's mineral resources is treated by counties.

BUILDING - PROBLEMS IN SCARCITY. *Prepared and published by the Young Management Corp., New York, N. Y. 106 p., appendix and index.*

This study comes to the conclusion that a very great volume of building (with particular reference to residential building) is needed "which could stimulate general business recovery more than PWA, CCC, WPA, and AAA together; and which could last longer than filling depression shortages." An increasing volume of business for the building-supply companies is considered assured for some time to come; "we are now in the fourth year of the upward phase the peak of which will not come until the 1940's." Nevertheless, it appears that the total amount of building and the peak of the current cycle will not exceed, nor perhaps even come up to the level of the last one, for causes "which lie deep in the organization of the building industry. Faced with a huge demand for its product, the industry is disorganized and inadequate."

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo., Ind., has announced plans for the construction of a new building at its plant in Kokomo to provide room for the company's growing business. Plans call for a new two-story fireproof office building, 132 ft. long and 44 ft. wide.

LOW COST CRUSHING FOR 52 YEARS



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"One Reduction" Roller Bearing Jaw Crushers For producing uniform cubical material . . . . free of flats and chips.

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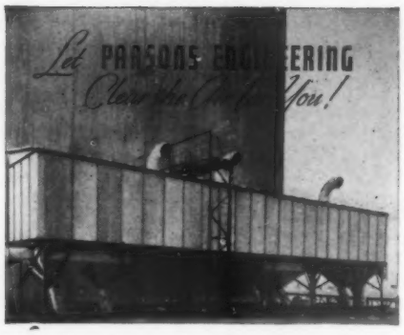

A 15-year record of repeat business would imply that sound Parsons engineering is worthy of *your* investigation, too. Parsons' patented oval bag principle, long life, low dust count and minimum maintenance enable Parsons Dust Arrestors to excel in the cement industry. Write for our Bulletin DA-6.

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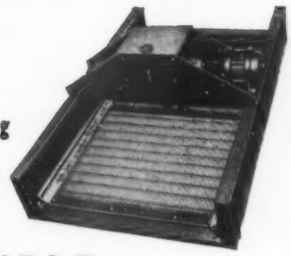
Uses of Fullers' Earth Continue to Decline

Consumption of fullers' earth in the United States has failed to keep pace with the growth of the petroleum industry in recent years even though 90 per cent. of the sales of these bleaching clays is used for refining petroleum products. Domestic production of fullers' earth in 1936, as reported by the Bureau of Mines, was 230,814 tons valued at $2,264,978 compared with 227,745 tons valued at $2,230,229 in 1935. Apparent consumption increased only 2 per cent. whereas petroleum refining jumped 10 per cent. More significant still, oil refiners made an all-time record last year, far ahead of their 1929 mark, whereas the quantity of fuller's earth used was 26 per cent. less in 1936 than in 1929 and 31 per cent. less than in 1930 when it reached its maximum of 328,642 tons.

The obvious conclusion is that much of the expanded consumption of artificially activated earths, made from bentonite, and of acid-sprayed earths, such as are produced especially in Texas, have invaded the market for fullers' earth. New methods of oil refining likewise have threatened to diminish the use of fullers' earth but inquiries in the trade lead to the conclusion that chemical processing of lubricating oils may have been overdone and that even oils so processed generally require some treating with fullers' earth. There is a feeling, too, that the recent trend away from percolation methods and in favor of contact methods may be now in reverse—a fact of importance to the fuller's earth industry inasmuch as the finer grades used in contact refining sell for only about $6.50 a ton, as against $10 to $12.50 a ton for coarser grades such as are used for percolation.

Progress is being made in finding uses for spent earth. It may be too much to expect that earth will be thrown away after being used only once but if the spent earth could be disposed of profitably, there would be less incentive for revivifying it after its efficiency had been impaired substantially. For about 5 years a leading California cement company has been making a weatherproof Portland cement adding to the clinker before grinding about 3 per cent. of spent clay containing 20 to 30 per cent. carbonaceous matter. The process (U. S. Patent 1755638) yields a cement that is at least as strong as ordinary Portland cement although it does not mature so rapidly.

THE NEW
LEAHY SCREEN
for
Fine Screening



DOUBLE DUSTPROOFING PROTECTION

A double housing of revolutionary design protects vibrator and internal mechanisms of the New Leahy No-Blind Vibrating Screen. Abrasive dusts cannot get in. Thus low repair costs, for which The Leahy already enjoys an enviable record, are further reduced. Bounding pieces cannot lodge against, or begin to reach any moving vibrator parts.

The New Leahy No-Blind Vibrating Screen will give you higher efficiency, lower repair costs, and minimum power costs for the production of more fines in less time.

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The Model "135" LOADER

is the fastest loading machine within $5,000 of its price, as well as heaviest, strongest and most powerful Loader built. It competes with BIG equipment. On a cost-per-yard basis, it's all alone. *Bulletin 134.*

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CINCINNATI
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Traffic News Digest

Legislation

Black-Connery Bill.—The Black-Connery bill as introduced in the Senate as Bill No. 2,475 has been revised by the Committee on Education and Labor so as to exempt from its provisions all railroad employees who are subject to the hours-of-service act and all seamen. This would exclude all railroad employees who are engaged in or connected with the movement of any train, including train dispatchers and telegraph operators. Railroad employees who are not connected with the movement of the trains, such as maintenance-of-way employees, shop men and office workers, would be subject to the provisions of the Black-Connery bill. Also subject to those provisions would be the employees of motor transport agencies. This means that while the Interstate Commerce Commission would have jurisdiction over interstate rates of both railway and truck carriers, the labor engaged in transportation would be subject to different laws which would be administered by different bureaus. The bill as reported out by the committee limits the jurisdiction of the Labor Standards Board in declaring that the board shall not have power to declare minimum wages in excess of 40c. per hr., but that higher minimum wages fixed by collective bargaining shall be encouraged, it being the object of this act to raise the existing wages in the low-wage group so as to attain as rapidly as practicable a minimum wage of 40c. per hr. without curtailing opportunities for employment and without the disturbance and dislocation of business and industry. The bill further gives the board power to fix maximum hours of not less than 40 per week but to encourage the fixing of shorter maximum hours by collective bargaining or otherwise.

Train-Limit Bill.—Opposition to the bill limiting the length of the freight trains to 70 cars has been voiced by the Midwest Shippers' Advisory Board in a letter signed by General Secretary W. Y. Wildman suggesting that members write to their senators asking them to vote against this bill. This letter claims that this legislation would add between 90 and 125 million dollars to the annual expense of the railroads which would have to be met by increased rates or increased service and the adoption of this bill is just putting the railroads one step nearer government ownership. On the other hand the following letter, allegedly written by President Whitney of the Brotherhood of Trainmen, has been sent to all state and subordinate lodge members in the United States:

"Dear Sirs and Brothers: Every effort is being put forward by us to bring about enactment of a national train-limit law at this session of the Congress. As might be expected, the special interests are vigorously opposing this legislation and flooding the Congress with propaganda against the train-limit bills.

"You are urged to write or wire your respective congressmen and senators and urgently request them to support our train-limit bills, S. 69 by Senator McCarran and H. R. 147 by Congressman Griswold. In addition to this, urge other trainmen and members of the other railway-labor organizations to do likewise. The chief excutives of the transportation organizations have agreed to inform their memberships on this legislation and to co-operate fully toward bringing about its enactment.

"As you know, the railroads to-day are receiving more for their wage dollar than ever before in history and they can well afford the additional wage cost involved in train-limit legislation. The public safety, as well as the safety of the railroad employees, together with the necessity for more flexible service to the public and greater employment opportunities in the railroad industry, fully justifies the enactment of this law as worthy social-reform legislation.

"This is a matter of great importance and I urge you to give it your best efforts."

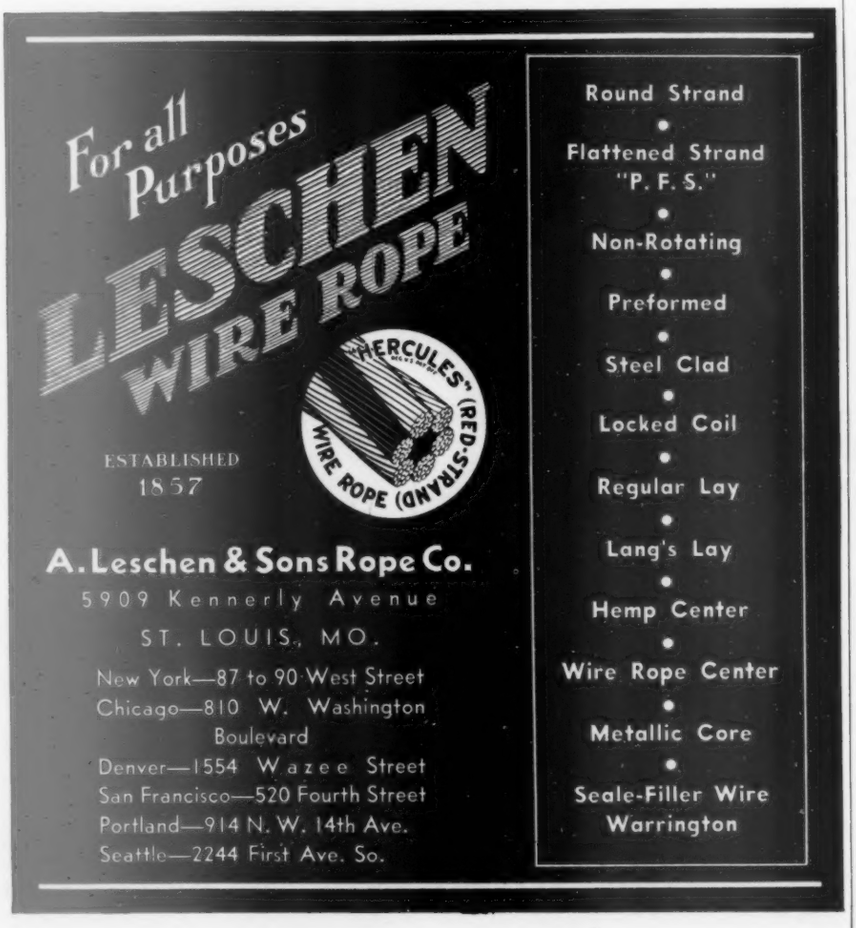
The arguments in this letter are refuted in the bulletin issued by the Transportation Assn. of America, which claims that this legislation is not needed as a safety measure and that the railroads can not well afford the additional cost. With the Congress seeking an early adjournment it is doubtful whether this bill will be considered by the Senate during this session.

Recent I. C. C. Decisions

Cement—The commission has awarded reparation on finding that the rate on cement from Laramie, Wyo., to Buffalo, Wyo., over an interstate route from April 4, 1932 to April 1, 1933 unreasonable to the extent that it exceeded 39c. The rate before the first date or after the last date was not found to have been unreasonable or otherwise unlawful. I. C. C. Docket 27,314 Monolith Portland Midwest Co. *v.* Wyoming Railway Co., *et al.*

Lime—In response to fourth-section applications Nos. 16,329, 16,489, 16,493 and 16,607 carriers have been granted fourth-section relief in connection with the rates on lime from and to points in New England, Eastern Trunk Line and Central territories. This applies on rates constructed on the basis prescribed in 112 I. C. C. 7 and 214 I. C. C. 417. The relief will not apply in connection with rates via through routes from producing points in New England to trunk line border points or to lighterage points in the New York harbor. The relief is subject to the usual 33⅓, 50 and 70% circuity limitations.—I. C. C. F. S. O. No. 12,836.

In response to fourth-section application No. 16,397 fourth-section relief has been granted in connection with the rates on lime from points in western trunk line, southwestern and Illinois Freight Assn. territories to destinations in western trunk line, Illinois Freight Assn. territories, Wyoming and southern Mississippi. The order prescribes mileage scales to be used in constructing the rates based on a dual minima of 30,000 and 50,000 lb. Relief is subject to the usual 33⅓, 50 and 70 per cent. circuity limitations. Basing or key points are provided in making rates on a group basis using the basing points in determining circuity and the average distances in determining rates.—I. C. C. F. S. O. No. 12,837.



Examiners' Reports

Sand and Gravel—Examiner Harold M. Brown proposes an award of reparation and a finding that the rates on sand and gravel from Oreapolis, Neb., to Red Oak, Shenandoah and Clarinda, Ia., are unreasonable to the extent that they exceeded or may exceed 70, 80 and 90c. per net ton to the destinations in their respective order.—I. C. C. Docket No. 27,652 Booth & Olson, Inc. *v.* C. B. E. Q.

Examiner Harold Brown recommends that the commission find the rate on sand and gravel from Haywarden, Ia., to Meckling, S. Dak., unreasonable to the extent that it exceeds or may exceed 70c. per net ton and that reparation be awarded.—I. C. C. Docket No. 27,632 Larson-Erling Co. *v.* St. Paul.

Whiting—In a case before the utility commission of New Jersey it was found that the transportation characteristics of chalk, whiting and ground limestone were similar and the New Jersey Commission issued an order requiring the maintenance of intrastate rates on limestone whiting on the basis prescribed by the Interstate Commerce Commission in American Lime & Stone Co. *v.* Pa., 201 I. C. C. 467 for ground limestone between points in trunk-line territory. The carriers in New Jersey petitioned the commission to investigate these rates under Sec. 13 as being unduly preferential of intrastate traffic and unduly prejudicial to interstate traffic. Examiner Charles M. Bardwell recommends that the commission discontinue the proceeding on finding that no violation of Sec. 13 has been shown to exist. He contends that the difference in the level of rates does not prove that the intrastate rates are unlawful. At the hearing no interstate shipper of whiting appeared to charge that he or his locality were prejudiced. —I. C. C. Docket No. 27,612 Intra State rates on whiting in New Jersey.

New Complaints Filed

Cement—The commission has instituted an investigation in the matter of intrastate rates from Neville Island and Universal, Pa., to destinations in the Pittsburgh metropolitan area under section 13. The B. & O., Pa., and other carriers allege that the rates prescribed by the Pa. Commission result in a violation of section 13. I. C. C. Docket No. 27,768 Cement (Neville Island) P. & O. V. Jct., and Universal, Pa., to Pittsburgh, Pa.

Sand, Gravel and Slag—In a complaint filed by T. P. Goodmin of Jackson, Miss. on behalf of the Mississippi Cement & Gravel Assn. of Jackson, Miss., it is alleged that the rates on sand, gravel and slag within Alabama were in violation of Sec. 1, 3, 13 and 15(a). The alleged prejudice is against interstate commerce from Mississippi to Alabama. The Commission has instituted an investigation under I. C. C. Docket No. 27,790 Sand, Gravel and Slag within Alabama.

The Stein-Brill Corp., 183 Varick St., New York, N. Y. announces a change in the corporate name to the Brill Equipment Corp. There will be no change in management.

The company also has opened an office and warehouse located in the Mart Bldg. at St. Louis, Mo.

The O. K. Clutch & Machinery Co. has appointed the following distributors: Industrial Equipt. Co., Albuquerque, N. M.; Industrial Machinery Co., Kansas City, Kan.; Mekeel Engineering Co., Milwaukee, Wis.; and W. C. Shankle, New Orleans, La.

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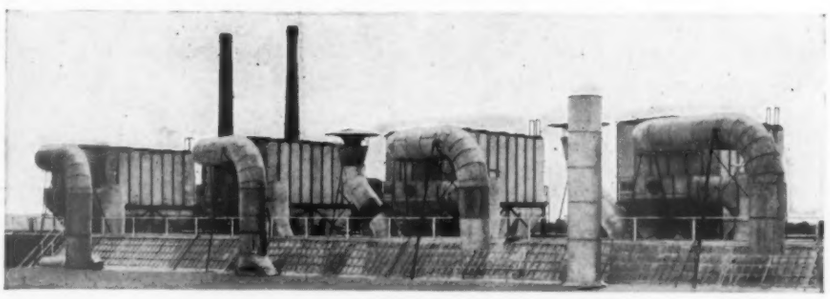
Get Bulletin No. 302

DRACCO Multi-Bag Filters are very ECONOMICAL to operate, and the cost of maintenance is reduced to a MINIMUM. ONE man can EASILY replace filter bags from the passageway. Remember,---it is NEVER necessary to enter the dirty air side of DRACCO Filters. With 20 years experience to draw upon DRACCO Engineers are qualified to offer you sound advice in solving your Dust problem. You are requested to write.



4 DRACCO Dust Collectors

DRACCO FILTERS are Maintained on the CLEAN AIR SIDE

WORKED ON DIRTY AIR SIDE • WORKED ON CLEAN AIR SIDE

Write for Bulletin No. 302

DRACCO CORPORATION

4077 E. 116th St., Cleveland, Ohio • New York Office, 130 W. 42nd St.

PNEUMATIC CONVEYORS • DUST COLLECTORS

New Machinery and Supplies

New 64-Lb. Drill Allows Deep-Hole Work in Rock

The L-12 64-lb. rock drill recently announced by the Sullivan Machinery Co., Chicago, was developed to give the quarryman an easy-handling medium-weight machine with extra drilling power and rotational strength for deep-hole work in hard rock. This rock drill can handle the heavy deep-hole drilling with the same speed of a heavy weight sinker and yet not fatigue the drill runner by the extra weight of the heavy machine. While this machine was developed primarily for hard rock it does handle any rock with a consistently fine performance.

The L-12 gets its power from a positive compression thrown axial type valve coupled with 2⅞-inch bore and long stroke piston. Besides handling standard sizes of collared steel, this machine has special construction which can be provided to handle round-lugged steel or shankless steels of striking block construction. Also a vented front-end construction can be provided to qualify with all laws on dust control.

Announce Improvements in High-Temperature Mortars

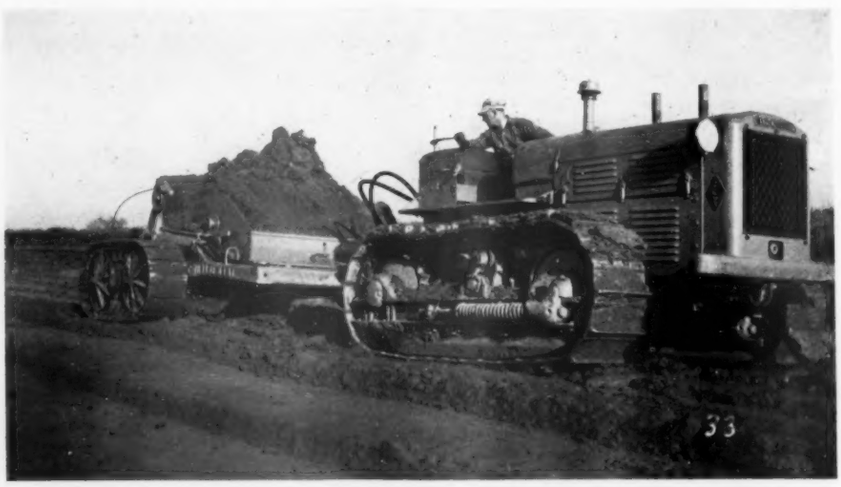
Further improvement has recently been made in the refractoriness and working quality of Harwaco Bond, a high-temperature bonding mortar recommended for use in industrial furnace masonry.

The improved product has a pyrometric cone equivalent of Cone 32 (3092 deg. F.). Use of this diaspore-base bonding mortar in place of mortar consisting essentially of fireclay is becoming increasingly general for laying fireclay, super-duty fireclay, and high-alumina brick where a strong bond must be maintained at the upper limits of industrial furnace operating temperatures. It remains uniformly soft and plastic throughout the steel drum or container in which it is shipped. The improvement in the product is the result of several years of research by the Harbison-Walker Refractories Co., Pittsburgh, Pa.

Develops Dewatering Tank to Precipitate Sludge

The Claude B. Schneible Co., Chicago, Ill., has developed a rectangular-type multi-louver dewatering tank for precipitating and dewatering the sludge from Schneible multi-wash dust collectors.

This unit is an addition to the line which includes elevated cylindrical dewatering tanks that discharge sludge into trucks and ground-level type concrete dewatering tanks for sludge precipitation on a large scale. The new rectangular type is for use in connection with smaller wet dust collecting systems that do not justify the larger truck or gondola-type tanks.



Small wagon scraper mounted on crawlers.

4 Cu. Ft. Wagon Scraper for Small Tractor Use

The new 4-cu. yd. wagon scraper known as the "Junior Continental" has been announced by the Continental Roll & Steel Fdry. Co., East Chicago, Ind. Designed for use with smaller 35 to 50 hp. crawler tractors, the new 4-cu. yd. model is the same in general design and operation as the larger Continental models. It is light in weight without sacrificing the ruggedness necessary to dig, load and haul capacity loads of tough clay, rock and root-imbedded soil, shale, hardpan, etc.

Other features are high-axle clearance, a large fast-dumping rear gate, the new Continental BE-GE hydraulic power-control unit with adaptors for all tractors of 35 to 50 hp., shorter overall length for easier turning, and a wide cutting blade, the width of cut being the same as that of the 5-yd. size.

Offers Molds for Casting Concrete Burial Vaults

The older designs of concrete vaults were merely a concrete box and cover; it was necessary to cement the cover to the body of the vault. Because of the practical difficulty of cementing two seasoned pieces of concrete together to make a water-tight joint, the air-sealed vault was developed; such a vault depends on the principle that so long as the vault is full of air, water cannot enter.

There are two types of air-sealed vault—the automatic sealing vault and several different styles of inverted-type vaults. The Automatic Sealing Vault Co., Peru, Ind., which manufactures adjustable steel molds for both types, developed the automatic sealing type, which was invented by E. D. Millhouse, president of the company. The vault seal depends upon mechanical design or the way the lid fits onto the body.

The inverted-type vault for which molds are offered by the Automatic Sealing Vault Co. is so constructed that it rests upon the base and not down over it. This eliminated any possibility of the vault's sinking from earth pressure.

Molds for the automatic-sealing vault are made of heavy sheet steel, substantially braced so as to make them absolutely rigid. All surfaces which come in contact with the concrete are free from rivet heads or other irregularities. The system of fastening the different sections of the molds together by means of key-pins and rods eliminates the use of bolts, nuts, screws and turnbuckles. The inverted-type molds are similarly constructed of heavy sheet steel, well braced and electrically welded. An arrangement of lugs held in slots with key pins

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Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
Prompt Shipment
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2435 W. 24TH PLACE CHICAGO, ILL.
Telephone CANAL 1459

Concrete burial vault of the automatic-sealing type.

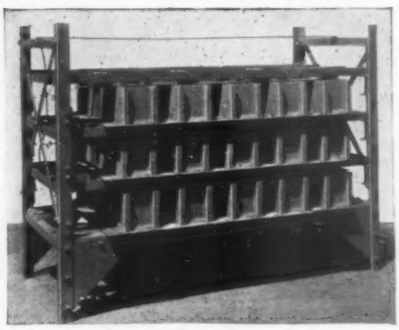
fastens the outside body molds together, while the core mold is held in position by bolts which are easily removed after the vault has been made.

The Automatic Sealing Vault Co. also furnishes a complete line of accessories for the concrete vault manufacturer, waterproofing materials, etc.

New Rack for Concrete Units Cured Electrically

A new design of curing rack for concrete products has been developed by The Technical Development Corp., Detroit, Mich., in conjunction with its electro cure process. The rack is 6½ ft. long, 5 ft. high, and 2 ft. 9 in. wide, with a capacity of 30 8 by 12 by 16 in. blocks, or 36 8 by 8 by 16 in. blocks. The uprights are 2½ by 2½ by ¼ in. steel angles, the frame being reinforced by steel gussets and by steel cross members at the ends. Movable decks are fabricated of 2 by 2 by ¼ in. steel angles.

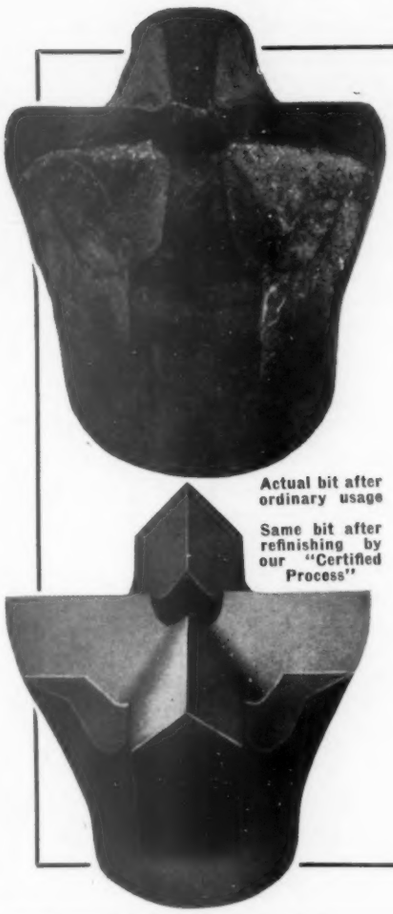
In the electro cure process, the temperature



Curing rack for concrete blocks.

of the block in the moisture-laden kiln atmosphere is stepped up by passing an electric current through the block which acts as a resisting medium, the result being accelerated curing, allowing removal of the product from the kiln in 8 hr. The metal pallet on which the block rests acts as one electrode. When the first tier of blocks has been placed on the rack, the second deck is let down. A galvanized metal plate, acting as the other electrode, is attached to the under side of the deck. As the second deck is loaded, the weight of the blocks lowers the deck against compression springs at the ends. As the electrode forms contact with the first tier of blocks, the deck's settling is arrested by stops and lighter springs between electrode and deck equalize the contact with the block underneath.

When the loaded rack is run into the kiln, electrical connection is made at the outlet plug and the brief curing process starts. The rack is of sturdy construction and convenient to load and unload.



Actual bit after ordinary usage

Same bit after refinishing by our "Certified Process"

100% EFFICIENCY

in New Method of Resharpening Bits

Get 100 per cent efficiency from our new, perfected method of resharpening bits, and save enough to justify shipment from any part of the country. Here is what our process does for you at a small fraction of the cost of buying new bits.

Each bit is normalized to take out strains in the steel from previous drilling. It is machined to its original cutting edge and clearance angle, one size smaller in gauge. The bit is hardened by reheating in a Pyrometer-controlled furnace, thereby eliminating guesswork, then it is coated with adhesive oil to prevent rusting and packed in a box marked for size and make.

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YOUR *Kind of Pipe*

Conveying water over 5,000 feet from river to washing screens.

In this light-walled pipe you have the bursting strength, the collapsing strength and even the stiffness of wrought pipe weighing twice as much. By cutting the weight in half you cut the transportation cost, handling cost, and erection cost. Let Taylor Spiral Pipe cut the cost of water lines and sand or gravel lines. Large stocks and facilities assure prompt deliveries.

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Light in weight, Sturdy in design, Resistant to abrasion and Guaranteed to stand up. Can be furnished in diameters from six inches up, with hooks, tapers, gates or other special features. Write for details.

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MIDDLETOWN OHIO

WELDING ENGINEERS · UWCO · MIDDLETOWN, OHIO.

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BACON FARREL CRUSHERS

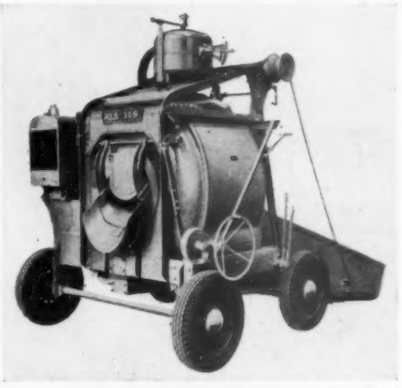
Complete Plants Designed and Equipped.
Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment.
Engineering Service.

EARLE C. BACON, Inc.
17 John Street New York, N. Y.

Speed and Style Featured in New Concrete Mixer

The Chain Belt Co., Milwaukee, Wis., announces a new stream-lined 14-S Mixer. New from top to bottom, this machine incorporates faster charging and discharging, lighter and stronger frame, new accurate water control, and increased engine power into a machine that is radically different from the old machine. Its appearance and fully enclosed working parts are completely in line with its new modern compact design.

Charging is made faster by the use of a "shimmy" skip which, together with the stream-lined shape of the skip, discharges the batch into the drum with a free, fast-sliding action. The drum with its "up-and-over" mixing action and oversize buckets has one piece construction with the pressed steel drum heads welded integral with the center sheet. Discharging through the extra large drum opening onto the stream-lined chute, the drum is completely cleaned in seven seconds. The new Rex water system with the new vertical measuring tank and non-by-pass free way valve is unusually accurate and allows no water to dribble into the drum. Mounted on a rigid steel frame, the mixer is supported from the axles by strong coil steel springs at each wheel and has automotive-type steering.

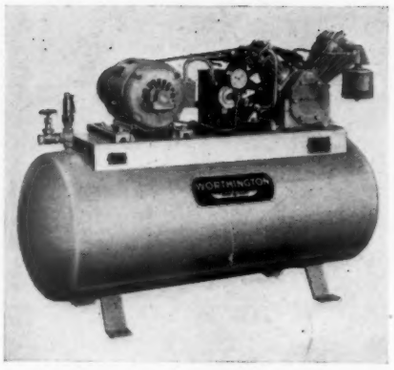


Faster charging and discharging feature this streamlined concrete mixer.

New Line of Tank-Mounted Air-Compressor Units

An improved line of tank-mounted compressor units for general industrial service has been developed by Worthington Pump and Machinery Corp., Harrison, N. J. Single-stage units are available with vertical compressors. The motor sizes range from ¼ to 5 h.p., with displacements from 1.43 to 67 cu. ft. per min. at a maximum pressure of 250 lb. per sq. in. Two-stage units are available with angle-type compressors. The motor sizes range from ¾ to 10 h.p., with displacements from 3.9 to 45 cu. ft. per min. at a maximum pressure of 250 lb. per sq. in.

A pressure switch, with a valve for unloading the compressor when starting or stopping, is furnished on all models. All units are equipped with Worthington feather valves. The crankshaft is carefully balanced to insure smooth operation. Full-floating wrist pins provide durability and quietness. The honed cylinder walls reduce friction and increase the life of the piston rings. Most models are available with either vertical or horizontal tanks (air receivers).



Tank-mounted compressor unit.

Lag Eliminated in New Pyrometer Controller

A new round-chart pyrometer controller has been developed by The Bristol Co. Waterbury, Conn., known as Bristol's Pyromaster controller. This instrument is a potentiometer pyrometer, operating on a simplified principle and is available in both pneumatic and electric types. It uses standard thermocouples and extension leads, and is for direct ink-marking on a round 12-inch chart, or for indicating on a large scale.

These potentiometer pyrometer controllers are automatically self-balancing and self-compensating for cold-end temperature changes. The penarm or indicator is actuated in small steps that follow each other at a rate depending upon the rate of change in the temperature at the themocouple. All lag is thus eliminated, permitting immediate response to changes exactly as they occur. The Pyromaster is available as: (1) A recorder, (2) A recorder with indicating scale, (3) A recorder controller, or (4) A recorder controller with indicating scale.

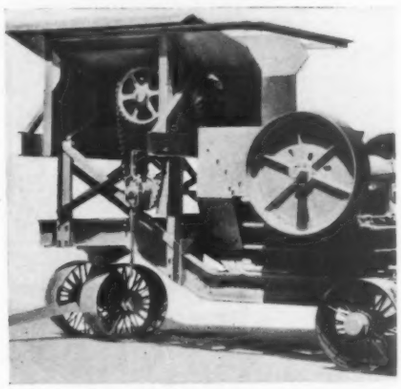
New Conveying Hose for Handling Dust, Abrasives

To combat silicosis, which is caused by dusts, fumes, mists and gases in industrial plants, United States Rubber Products, Inc., New York, N. Y., has designed new blower and dust suction hoses to meet practically every conveying condition.

Dust hose—Official P-5508 (for abrasives) is designed for either suction or light pressure, such as that generated by a blower. It will successfully withstand the abrasive action set up in the conveyance of various abrasive types of particles. The carcass of the hose is supported by a steel wire helix and is as light as is consistent with long-wearing qualities. It is finished with outside corrugations to lend flexibility and is available in three thicknesses of pure gum tube. The thickness is dependent upon the abrasive nature of the material being conveyed. Dust Conveying Hose is made in sizes of 2, 3, 4, 5, 6, 8, 10, and 12 inches. Blower hose—Official P-5509 is for fumes only.

Apron Feeder and Crusher Mounted on Mobile Unit

A unique feeder-crusher unit recently developed by the Universal Crusher Co., Cedar Rapids, Ia., for a large rock-crushing operation involves the use of a Universal primary jaw crusher mounted on a portable rig, with an apron feeder above it, permitting of a steady feed of rock into the crusher. The maker states



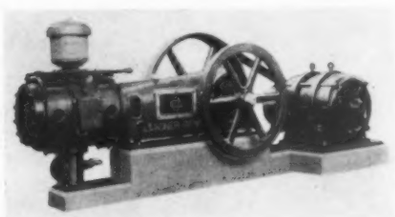
Portable feeder—crusher unit.

that this apron feeder not only speeds-up output by maintaining a steady flow of rock to the crusher, but saves much time formerly required in setting up and dismantling stationary feeders.

This combination of crusher and feeder mounted on a single mobile unit is made to operate in conjunction with a similar crushing equipment on which is mounted a roll crusher for secondary crushing. A belt conveyor carries the primary crushed rock from one crusher to the other; a second conveyor unit handling the final product to temporary storage bins.

Electro-Pneumatic Control on Horizontal Compressor

The Gardner-Denver Co. announces an improved single stage, horizontal air compressor for heavy-duty full load service and continuous operation at low power costs. Known as the "RX" compressor, it has totally en-



Single-stage horizontal compressor.

closed dustproof construction without sacrifice of accessibility as well as accurate balance and freedom from vibration.

Another important feature of the "RX" compressors is the electro-pneumatic control. With this control the compressor always starts unloaded and the air supply is automatically adjusted to fit the air requirements, resulting in exceptional part-load economy. The compressors are equipped with Timken tapered adjustable-roller main bearings.

Coming Events

October 8-9, 1937, Urbana, Ill.—Mineral Industries Conference, University of Illinois.

January 17-22, 1938, Cleveland, Ohio. — Annual Road Show, American Road Builders' Assn., Cleveland Auditorium.

January 24-26, 1938, Cincinnati, Ohio. — Twenty-first annual convention and machinery exhibition, National Crushed Stone Assn., Netherland Plaza Hotel.

February 1-3, 1938, Cincinnati, Ohio. — Twenty-second annual convention and machinery exhibition, National Sand & Gravel Assn., Netherland Plaza Hotel.

February 1-3, 1938, Cincinnati, Ohio. — Annual convention and machinery exhibition, National Ready Mixed Concrete Assn., Netherland Plaza Hotel.

5 STAR FEATURES

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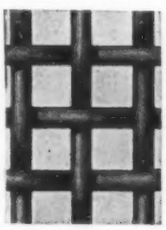
★ Wears five to ten times as long as cloth made of ordinary steel.

★ Withstands vibration without crystallization.

★ Super-tough to resist abrasion.

★ Maintains accuracy throughout life of screen.

★ Has outworn all other special Aloy cloths.



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the Newest New Holland

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CIRCLE THROW VIBRATING SCREEN

Balanced for variations in loads and speeds. Extension chutes and rubber mountings are standard — 100% safety factor in the rotary mechanism. Capacities up to 100 tons per hour.

ROLL CRUSHER with Pulsating Feeder

Gives double the usual capacity. Rib shell construction increases angle of grip and reduces dust. Investigate the advantages of this modern Roll Crusher.

NEW HOLLAND MACHINE CO.
New Holland, Penna.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified.

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*Warren Brothers Roads Co.

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*Eagle Iron Works
Pettibone-Mulliken Corp.

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.
Patterson Fdry. & Machine Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Air Compressors (Portable)
*Chicago Pneumatic Tool Co.
*Fuller Company
Hardsoog Wonder Drill Co.
*Ingersoll-Rand Co.

Air Compressors (Stationary)
*Ingersoll-Rand Co.

Air Filters
*Blaw-Knox Co.
Dracco Corporation
*Parsons Engineering Corp.
*Western Precipitation Co.

Air Pumps
*Fuller Company
*Ingersoll-Rand Co.

Air Separators
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
Patterson Fdry. & Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
Sturtevant Mill Co.
*Williams Patent Crusher & Pulverizer Co.

Alloys (Steel)
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*Chain Belt Co.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Ash and Refuse-Handling Equipment
Allen-Sherman-Hoff Co.
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
*Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
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*Jeffrey Mfg. Co.
*Link Belt Co.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.

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Automatic Feeders
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Automatic Weighers
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*Fuller Company
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Backfillers
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*Bucyrus-Erie Co.
*Harnischfeger Corp.
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Northwest Engr. Co.

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The Valve Bag Co.

Bags (Cement, Gypsum, Lime, etc.)
The Valve Bag Co.

Bags (Paper Single, Double, Multi-Wall)
The Valve Bag Co.

Bags (Valve)
The Valve Bag Co.

Balls (Grinding)
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*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Traylor Engr. & Mfg. Co.

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Hetherington & Berner, Inc.
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*Link-Belt Co.
Robins Conveying Belt Co.
*Sprout, Waldron & Co.
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Belt Drives
*Chain Belt Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belting
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
Hewitt Rubber Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Republic Rubber Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
*Wickwire Spencer Steel Co.

Belting (Multiple V)
Goodyear Tire & Rubber Co.
Republic Rubber Co.

Belt Lacings
Flexible Steel Lacing Co.

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Republic Rubber Co.

Bin Gates
Allen-Sherman-Hoff Co.
Bartlett & Snow Co., C. O.
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*Fuller Company.
*Good Roads Machy. Corp.
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Allen-Sherman-Hoff Co.

Bins (Concrete)
Long Co., M. A.

Bins (Steel)
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*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
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Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
DuPont de Nemours & Co.

Blasting Supplies
DuPont de Nemours & Co.
*Ensign-Bickford Co.

Block Machines (Concrete)
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Blocks (Pillow)
*Jeffrey Mfg. Co.

Blocks (Sheave)
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Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
*Sprout, Waldron & Co.

Bodies (Car & Motor Truck)
Easton Car & Construction Co.

Bodies (Motor Truck, Concrete Mixing)
Bartlett & Snow Co., C. O.
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*Chain Belt Co.
Gar Wood Industries, Inc.
Jaeger Machine Co.

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Pennsylvania Drilling Co.

Brick Machines (Concrete)
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Dunn Mfg. Co.
Patterson Fdry. & Machine Co.

Bronze Work (Ornamental)
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*Tyler Co., W. S.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Clamshell, Orange-Peel, Etc.)
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*Blaw-Knox Co.
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*Harnischfeger Corp.
*Link-Belt Co.
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Wellman Engr. Co.

Buckets (Dump)
*Jaeger Machine Co.

Buckets (Dragline—Cableway)
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Bucyrus-Erie Co.
*Link-Belt Co.
*Sauerman Bros., Inc.
Wellman Engr. Co.

Buckets (Elevator and Conveyor)
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*Chain Belt Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone-Mulliken Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

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Easton Car & Construction Co.
*Koehring Co.

Bulk-Cement Storage Plants
*Sprout, Waldron & Co.

Bulldozers
Gar Wood Industries, Inc.

Cableways
*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
*Link-Belt Co.
*Sauerman Bros., Inc.
*Wickwire Spencer Steel Co.

Caps (Blasting)
DuPont de Nemours & Co.

Capstans (See Winches and Capstans)

Car Dumpers
*Link-Belt Co.
Wellman Engr. Co.

Car Liners (Paper)
Hummel-Foley Corp.

Car Pullers
Bartlett & Snow Co., C. O.
Clyde Iron Works, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Carriers
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Carryalls
*Austin-Western Road Machy. Co.
Easton Car & Construction Co.
*Koehring Co.

Cars (Quarry & Gravel Pit)
*Austin-Western Road Machy. Co.
Easton Car & Construction Co.

Car Wheels — (See Wheels — Car)

Castings
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
*Eagle Iron Works
*Hardinge Co.
Hetherington & Berner, Inc.
Holmes & Bros., Inc., Robt.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Pateerson Fdry. & Machine Co.
Pettibone-Mulliken Corp.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete Mixing Plants (Comp.)
Bartlett & Snow Co., C. O.
*Jaeger Machine Co.
*Sprout, Waldron & Co.

Chain Attachments
*Chain Belt Co.
*Jeffrey Mfg. Co.

Chain (Dredge and Shovel)
Manganese Steel Forge Co.

Chain Drives
*Chain Belt Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Chute Lining (Rubber)
Goodyear Tire & Rubber Co.

Chutes and Chute Liners
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.

Classifiers
*Deister Machine Co.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Patterson Fdry. & Machine Co.
Simplicity Engr. Co.

Clips (Wire Rope)
*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
*Wickwire Spencer Steel Co.

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Patterson Fdry. & Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Breakers (Air)
*Ingersoll-Rand Co.

Concrete Mixers
*Blaw-Knox Co.
*Chain Belt Co.
*Jaeger Machine Co.
*Koehring Co.

Concrete Products Plant Equipment
Universal Concrete Pipe Co

Concrete Slab-Raising Equipment (Mud-Jacks)
*Koehring Co.

Condensers
*Ingersoll-Rand Co.

Cones (Sand-Washing)
Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Contractors and Builders
Long Co., M. A.

* See also information in the 1937 Pit and Quarry HANDBOOK.

When you write, ask also for Bulletin 105, describing the newest of Jaw Crushers.

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are being made by owners of

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Every time a new TY Crusher goes into operation, we get an enthusiastic letter from the owner telling us how pleased he is at making more money. If you don't know this machine, write for our Bulletin 3012 — then you'll see why it is so popular, and you'll want one too!

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Write for Bulletin containing description of all sizes and types.

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*Chain Belt Co.
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Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Conveyors and Elevators
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
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*Barber-Greene Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
Diamond Iron Works
Dracco Corporation
*Fuller Company
*Good Roads Machinery Corp.
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Holmes & Bros., Inc., Robt.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
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*Link-Belt Co.
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Patterson Fdry. & Machine Co.
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*Link-Belt Co.
*Robins Conveying Belt Co.

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*Jeffrey Mfg. Co.

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*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

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*Sprout, Waldron & Co.

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*Bucyrus-Erie Co.
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*Koehring Co.
*Link Belt Co.
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*American Pulverizer Co.
Bartlett & Snow Co., C. O.
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*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Allis-Chalmers Mfg. Co.
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*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Dixie Machy. Mfg. Co.
*Good Roads Machinery Corp.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng Corp
Sturtevant Mill Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bacon, Inc., Earle C.
Bartlett & Snow Co., C. O.
Diamond Iron Works
*Good Roads Machinery Corp.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Nordberg Mfg. Co.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.

Crushers (Ring)
*American Pulverizer Co.
Bartlett & Snow Co., C. O.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
Diamond Iron Works
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.
*Williams Patent Crusher & Pulverizer Co.

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*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
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New Holland Machine Co.
*Williams Patent Crusher & Pulverizer Co.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

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*Ingersoll-Rand Co.

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American Manganese Steel Co.
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*Bucyrus-Erie Co.
*Koehring Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

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*Bucyrus-Erie Co.
*Good Roads Machinery Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Bucyrus-Erie Co.
*Harnischfeger Corp.
*Koehring Co.
*Link-Belt Co.
Marion Steam Shovel Co., The
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*Bucyrus-Erie Co.
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Drill Bit Reconditioning
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*Ingersoll-Rand Co.
Rock Bit Sales & Service, Inc.
Timken Roller Bearing Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
*Ingersoll-Rand Co.

Drills (Core)
Hoffman Bros. Drilling Co.
*Ingersoll-Rand Co.
Pennsylvania Drilling Co.

Drills (Diamond)
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*Ingersoll-Rand Co.
Pennsylvania Drilling Co.

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*Ingersoll-Rand Co.

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*Ingersoll-Rand Co.
*Jeffrey Mfg. Co.

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*Ingersoll-Rand Co.

Drill Steel
*Ingersoll-Rand Co.

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*Allis-Chalmers Mfg. Co.
*Chain Belt Co.

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*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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McLanahan and Stone Corp.
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*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

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Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
Dracco Corporation
*Parsons Engineering Corp.
*Western Precipitation Corp.

Dust Collecting Systems
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Blaw-Knox Co.
Dracco Corporation
*Parsons Engineering Corp.
Patterson Fdry. & Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Western Precipitation Corp.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
Dracco Corporation
*Fuller Company
*Parsons Engineering Corp.
*Western Precipitation Corp

Dust Filters
*Parsons Engineering Corp.
*Western Precipitation Corp

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

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Electrical Equipment
*Allis-Chalmers Mfg. Co.
*Fairbanks, Morse & Co.

Electrodes (Welding)
Stulz-Sickles Co.

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*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
*Fuller Company
Hetherington & Berner, Inc.
Holmes & Bros., Inc., Robt.
Iowa Mfg. Co.
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Patterson Fdry. & Machine Co.
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*Traylor Engr. & Mfg. Co.

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Engines (Diesel)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
*Fairbanks, Morse & Co.
*Ingersoll-Rand Co.
*Nordberg Mfg. Co.

Engines (Hoisting)
Clyde Iron Works, Inc.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
*Fairbanks, Morse & Co.
*Ingersoll-Rand Co.
*Nordberg Mfg. Co.

Engines (Steam)
*Morris Machine Works
*Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Explosives
DuPont de Nemours & Co.

Fabricating (Electric Arc and Oxy-Acetylene)
Smith Co., S. Morgan
Stulz-Sickles Co.

Fans (Exhaust)
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
Diamond Iron Works
*Fuller Company
*Good Roads Machinery Corp.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.

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Allen-Sherman-Hoff Co.

Fuses (Detonating)
DuPont de Nemours & Co.
*Ensign-Bickford Co.

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*Cincinnati Rubber Mfg. Co.
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*Link-Belt Co.

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Bartlett & Snow Co., C. O.
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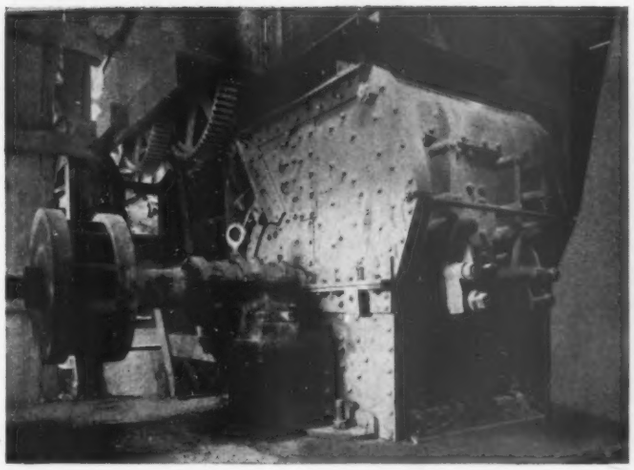
*See also information in the 1937 Pit and Quarry HANDBOOK.



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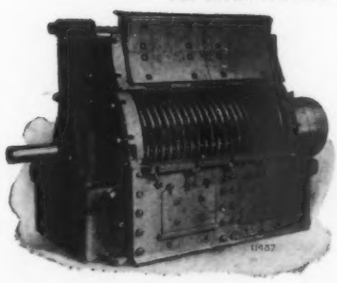
in the broad Jeffrey line for the accurate reduction of a wide variety of materials in the stone products field. There are many sizes for handling either large or small capacities - - - with machines of medium weight for light work and extra heavily constructed units for heavy work.

Jeffrey swing hammer pulverizers and crushers have the unique feature of reducing through a series of distinct steps, the greater part of the reduction being done in the upper crushing chamber before the material reaches the screen bars in the bottom of the machine.

Another exclusive feature is the heavy renewable liner on the breaker plate, with ledge along lower edge for retaining material being pulverized in suspension. The extra heavy shaft on Jeffrey pulverizers is made of high carbon forged steel, and is fitted with ball bearings.

All these features . . and there are more . . tend to produce a better product and do it with less power. You can save in more ways than one with Jeffrey reduction units.

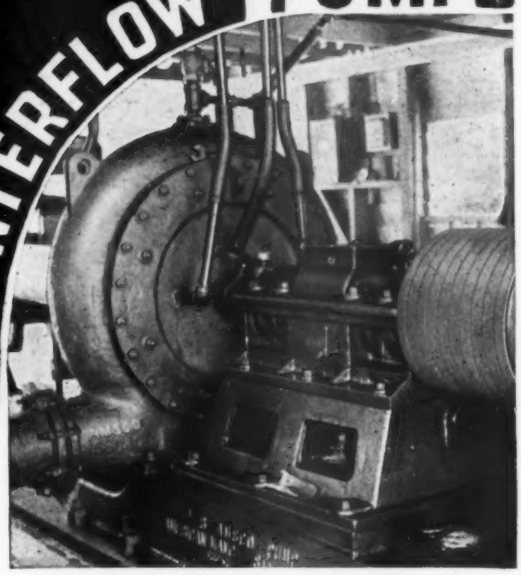


Tell us the material you want reduced . . what capacity . . size desired . . and from our 44 years' reduction experience and our broad line . . we can readily select a unit to do the job satisfactorily and economically.

The Jeffrey Manufacturing Company

917-99 North Fourth Street, Columbus, Ohio

AMSCO "COUNTERFLOW" PUMPS



FOR HEAVY DUTY DREDGING AND SAND HANDLING . . .

AMSCO "COUNTERFLOW" Pumps are highly economical for dredging and sand handling service because their exclusive design minimizes internal wear by introducing clear water under pressure between the impeller shrouds and the pump shell side plates to produce the "counterflow" action. This unique feature in itself adds years to the life of AMSCO Pumps that normally outlive other pumps because of the correct application of abrasion and impact resistant Manganese Steel, "the toughest steel known."

Other important efficiency-increasing features of AMSCO "COUNTERFLOW" Pumps are: the wide funnel-mouthed impeller which is "streamlined" to reduce the thrust of inflowing materials; the threaded impeller bore which enables the impeller to be firmly fixed on the pump shaft without bolting, keying or set screws; the elimination of internal leakage; sturdy outboard bearings; and easily removed side plates for inspection and impeller replacement.

The "counterflow" action and the streamlining of the impeller reduce the resistance of material being handled, resulting in a definite power saving. This saving in power, together with minimized maintenance cost, makes AMSCO Pumps a prime factor where economy of operation is desired.

"COUNTERFLOW" design is available in all types of new AMSCO Pumps. Most sizes and types of AMSCO Pumps placed in service previous to the introduction of the "COUNTERFLOW" design can be converted at a nominal cost. Many operators are availing themselves of the savings that "COUNTERFLOW" design effects by having their old pumps changed over.

Send for a copy of the new AMSCO Pump Bulletin showing numerous Pump installations and details on pipe line fittings, cutter heads, etc.

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Division of the American Brake Shoe & Foundry Company

396 East 14th Street, Chicago Heights, Ill.

Foundries at

Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif.; St. Louis, Mo. Offices in Principal Cities

AMSCO

TRADE MARK REGISTERED

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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*Sprout, Waldron & Co.

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*Robins Conveying Belt Co.
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*Hendrick Mfg. Co.
*Link-Belt Co.

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Goodyear Tire & Rubber Co.
Hewitt Rubber Corp.
*Ingersoll-Rand Co.
Republic Rubber Co.

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Republic Rubber Co.

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*Barber-Greene Co.
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*Chain Belt Co.
*Good Roads Machinery Corp.
*Jeffrey Mfg. Co.
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Smith Engr. Works
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*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Patterson Fdry. & Machine Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

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*Chicago Bridge & Iron Co.
*Hardinge Co.

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*Smidth & Co., F. L.

Lime-Handling Equipment
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Fuller Company
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
Kritzer Co., The
*Link-Belt Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Robins Conveying Belt Co.

Lime and Hydrating Plants
*Chicago Bridge & Iron Co.
*Hardinge Co.
Traylor Engr. & Mfg. Co.

Lime Kilns
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Lime Putty Plants
*Chicago Bridge & Iron Co.

Liners, Car (Paper)
Hummel-Foley Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Barber-Greene Co.
Bartlett & Snow Co., C. O.
*Bucyrus-Erie Co.
*Chain Belt Co.
*Fuller Company
*Good Roads Machinery Corp.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manierre Eng. & Machy. Co.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Loaders (Box Car)
Manierre Eng. & Machy. Co.

Locomotives (Diesel)
*Whitcomb Locomotive Co.

Locomtives (Diesel-Electric)
*Whitcomb Locomotive Co.

Locomotives (Electric, Gas, Steam)
*Whitcomb Locomotive Co., The

Locomotives (Gas-Electric)
*Whitcomb Locomotive Co.

Locomotives (Oil-Electric)
*Whitcomb Locomotive Co.

Locomotives (Storage Battery)
*Jeffrey Mfg. Co.

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Lubricants
*The Gredag Corp.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Manganese Steel Castings
American Manganese Steel Co.
Pettibone-Mulliken Corp.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Taylor-Wharton Iron & Cteel Co.

Mechanical Rubber Goods
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Hewitt Rubber Corp.
Republic Rubber Co.

Mill Liners and Linings
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Patterson Fdry. & Machine Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Mills (Ball, Tube, etc.)
*Allis-Chalmers Mfg. Co.
*Hardinge Co.
Patterson Fdry. & Machine Co.
*Traylor Engr. & Mfg. Co.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bartlett & Snow Co., C. O.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
Patterson Fdry. & Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.
*Fairbanks, Morse & Co.
*Harnischfeger Corp.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
*Tyler Co., W. S.

Nozzles (Gravel Washing)
*Chain Belt Co.
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
*Chain Belt Co.
*Deister Concentrator Co.

Oils
*The Gredag Corp.

Packings
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Hewitt Rubber Corp.
Republic Rubber Co.

Partitions (Wire)
National Wire Cloth Co.

Paving Mixers
*Chain Belt Co.
*Jaeger Machine Co.
*Koehring Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Sprout, Waldron & Co.
*Wickwire Spencer Steel Co.

Pipe, Dredge (Floating and Shore)
*Chicago Bridge & Iron Co.
Taylor Forge & Pipe Works
United Welding Co.

Pipe Flanges
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Pipe Forms (Concrete)
Universal Concrete Pipe Co.

Pipe Machines (Concrete)
Universal Concrete Pipe Co.

Pipe (Welded)
Taylor Forge & Pipe Co.
United Welding Co.

Plants (Aggremeter) (See Aggremeter Plants)

Plug Valves (See Valves)

Pneumatic Conveying Systems (See Conveyors—Pneumatic)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
*Barber-Greene Co.
*Fuller Company
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Barber-Greene Co.
Bartlett & Snow Co., C. O.
Diamond Iron Works
*Good Roads Machinery Corp.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Precipitators
*Western Precipitation Corp.

Pre-formed Wire Rope
*American Cable Division of the American Chain & Cable Co., Inc.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Proportioning Equipment
*Blaw-Knox Co.
*Jaeger Machine Co.

Pulleys
Sprout, Waldron & Co.

Pulleys (Magnetic)
*Sprout, Waldron & Co.

Pulleys (Wing)
*Sprout, Waldron & Co.

Pulverized Fuel Systems
Bartlett & Snow Co., C. O.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.

Pulverizers (See also Crushers, Mills, etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
Patterson Fdry. & Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Pump Parts
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Cteel Co.

Pump Valves (See Valves, Pump)

Pumps (Air-Lift)
*Fuller Company
*Ingersoll-Rand Co.

Pumps (Bulk Cement)
*Fuller Company

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works
*Smidth & Co., F. L.

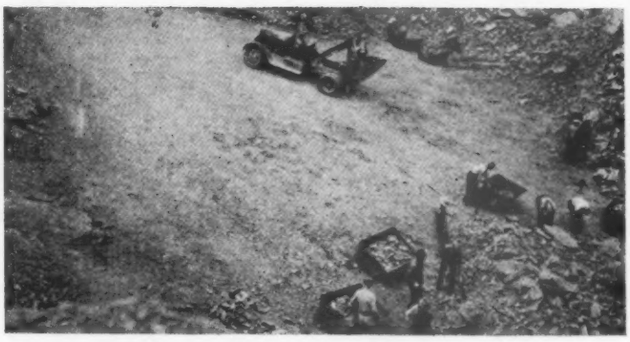
Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Chain Belt Co.
Erie Pump & Engine Works
*Fairbanks, Morse & Co.
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works
Pettibone-Mulliken Corp.

Pumps (Dredging)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bucyrus-Erie Co.
Erie Pump & Engine Works
*Fairbanks, Morse & Co.
Hetherington & Berner, Inc.
*Ingersoll Rand Co.
Kansas City Hay Press Co.
*Morris Machine Works
Pettibone-Mulliken Corp.

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.

*See also information in the 1937 Pit and Quarry HANDBOOK.

DEMPSTER



DUMPSTERS

They increase profits by decreasing loading, hauling and dumping time.

Detachable buckets are spotted at points of loading and filled while previously filled buckets are being hauled to destination.

Loaded buckets are picked up after empty buckets are respotted. It is all very simple.

SAVE·TIME↓

No heavy costly equipment to eat into profits—no delay — no high upkeep cost—no disappointments.

A hoisting device raises bucket to desired height — can be installed on your present trucks if desired or any other.

It's the modern, easy, speedy, economical and efficient way of hauling material more profitably. Low initial investment.

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WRITE FOR FACTS!

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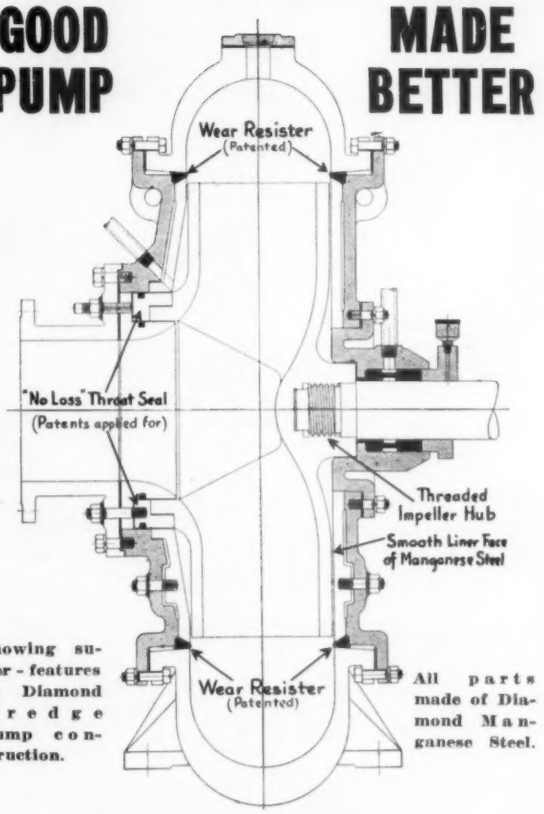
DEMPSTER BROTHERS, INC.

KNOXVILLE TENN.

DIAMOND

A GOOD PUMP NOW MADE BETTER


Wear Resister (Patented)
"No Loss" Throat Seal (Patents applied for)
Threaded Impeller Hub
Smooth Liner Face of Manganese Steel
Wear Resister (Patented)

Showing super-features of Diamond Dredge Pump construction.

All parts made of Diamond Manganese Steel.

DIAMOND DREDGE PUMP

now give their users even better performance because of newly developed features. Operators can now produce material at a still lower cost. The patented "Wear Resister" protects pump shell, side plates and liners from wear at vital points. Threaded Impeller Hub or Bore gives greater impeller throat clearance and insures a true running impeller at all times. "No Loss" Throat Seal prevents internal leakage. P.M. Co. Products include Traveling Chain Cutter, Rotary Cutters, Elbows, Flap Valves, Nipples, Jaw Plates, Crusher Parts, Dippers, Dipper Teeth, Sheaves, and other Manganese Steel Products.

PETTIBONE MULLIKEN CORP.

4710 W. Division St. Chicago, Ill.

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*Link-Belt Co.
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Patterson Fdry. & Machine Co.
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Smith Engr. Works

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Smith Engr. Works

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*Fairbanks, Morse & Co.

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Buffalo Scale Co.
*Fairbanks, Morse & Co.

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*Link-Belt Co.
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Bartlett & Snow Co., C. O.
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*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Link-Belt Co.
Ludlow-Saylor Wire Co.
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National Wire Cloth Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Simplicity Engr. Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Sturtevant Mill Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
*Wickwire Spencer Steel Co.

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*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Barber-Greene Co.
Bartlett & Snow Co., C. O.
*Deister Concentrator Co.
*Deister Machine Co.
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*Good Roads Machinery Corp.
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*Chain Belt Co.
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*Gruendler Crusher & Pulverizer Co.
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*Jeffrey Mfg. Co.
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*Sprout, Waldron & Co.

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*Austin-Western Road Machy. Co.
*Bucyrus-Erie Co.
*Harnischfeger Corp.
*Koehring Co.
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*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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Bartlett & Snow Co., C. O.
*Chain Belt Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone-Mulliken Corp.
*Sprout, Waldron & Co.

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*Chicago Bridge & Iron Co.
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*Sprout, Waldron & Co.

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Owen Bucket Co.

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Bartlett & Snow Co., C. O.
*Chain Belt Co.
*Chicago Bridge & Iron Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

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*Ingersoll-Rand Co.

Sweeping Systems
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Tanks
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Patterson Fdry. & Machine Co.
*Traylor Engr. & Mfg. Co.
United Welding Co.

Tanks (Elevated Steel)
*Chicago Bridge & Iron Co.

Tanks (Sand-Settling)
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Good Roads Machinery Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Patterson Fdry. & Machine Co.
Smith Engr. Works

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*Hendrick Mfg. Co.
*Tyler Co., N. S.

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*Hardinge Co.
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Goodyear Tire & Rubber Co.

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Track & Track Material
Taylor-Wharton Iron & Steel Co.

Track Equipment
Pettibone-Mulliken Corp.

Track Shifters
*Nordberg Mfg. Co.

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*Allis-Chalmers Mfg. Co.
Caterpillar Tractor Co.

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Easton Car & Construction Co.

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*American Steel & Wire Co.

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*Allis-Chalmers Mfg. Co.

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*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
Kritzer Co., The
*Link-Belt Co.

Trippers
Bartlett & Snow Co., C. O.
*Chain Belt Co.
*Good Roads Machinery Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
*Chain Belt Co.
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Tubes (For Tire Casings)
Goodyear Tire & Rubber Co.

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Smith Co., S. Morgan

Turntables (Railway, Industrial)
Easton Car & Construction Co.

Underground Loaders
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.

Unloaders (Box Car)
*Barber-Greene Co.
Bartlett & Snow Co., C. O.
*Chain Belt Co.
*Fuller Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manierre Eng. & Machy. Co.

Valves (Pump)
*Cincinnati Rubber Mfg. Co.
Taylor Forge & Pipe Works

Variable Speed Reducers or Transmissions
*Chain Belt Co.
*Link-Belt Co.

Vibrating Screen Plate
Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

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Vibrators
*Ingersoll-Rand Co.
*Jeffrey Mfg. Co.
*Tyler Co., W. S.

Wagons (Dump)
*Austin-Western Road Machy. Co.
Easton Car & Construction Co.
*Koehring Co.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
Diamond Iron Works
*Eagle Iron Works
*Good Roads Machinery Corp.
Haiss Mfg. Co., Geo.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Smidth & Co., F. L.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Weighing Equipment (Automatic)
*Blaw-Knox Co.
*Fuller Co.
*Jaeger Machine Co.

Welding Bars, Wedge and Applicator (Nickel - Manganese Steel)
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Welding and Cutting Equipment
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Stulz-Sickles Co.

Welding Rods
American Manganese Steel Co.
Stulz-Sickles Co.

Welding Service
*Rock Bit Sales & Service, Inc.
Smith Co., S. Morgan
Stulz-Sickles Co.
United Welding Co.

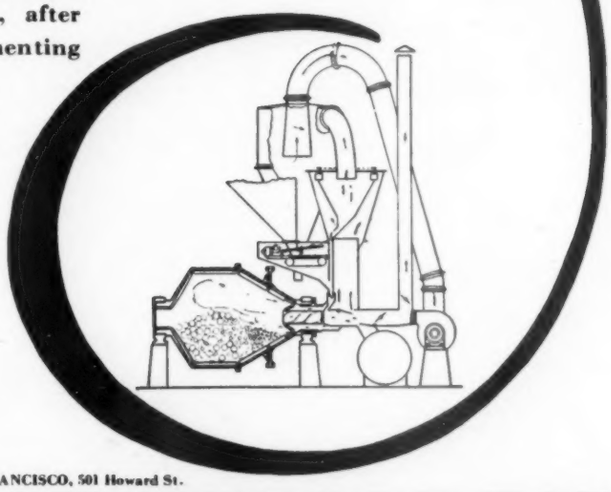
Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
*Harnischfeger Corp.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.
United Welding Co.
*Wickwire Spencer Steel Co.

Well Drills (See Drills—Well)

*See also information in the 1937 Pit and Quarry HANDBOOK.

dry grinding by

SAVE money—buy the "Hardinge Thermomill," which *drys as it grinds!* Two operations at one cost! Nothing can match it for grinding damp material. *And it's the only mill of its kind that grinds and drys abrasive materials, without excessive wear and costly upkeep!* Many of the largest companies, here and abroad, adopted this unit, after making exhaustive tests, and experimenting with other mills. They've found it practical and economical. You, too, may find it the most efficient solution to your own grinding problem. *Will you write us about it?*



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The JUMBO JR. CRUSHER reduces "One Man" size limestone to Agricultural size in one operation

Also crushes one man stone to 1¼" or ¾" in one operation . .

CUTAWAY VIEW
of a Williams "Jumbo Junior" Crusher, Showing Hammers and Sizing Grates.

No other machine will make agricultural limestone cheaper than the "Jumbo Jr." as it crushes the "one man" size stone to dust in one operation, avoiding much expensive hand sledging.

Crushing is accomplished by the hammer principle with heavy manganese steel hammers which when revolved at high speed crush the stone by impact. A grate in the bottom of the crusher holds all material in the crushing chamber until of proper size to pass through the openings.

Six sizes — ranging from 3 tons to 75 tons per hour — write for more descriptive bulletins today.

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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

WILLIAMS

PATENT CRUSHERS GRINDERS SHREDDERS

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*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

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Taylor-Wharton Iron & Steel Co.
Tyler Co., W. S.
*Wickwire Spencer Steel Co.

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*American Steel & Wire Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.
*Wickwire Spencer Steel Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
*American Cable Division of the American Chain & Cable Co., Inc.
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Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.
*Wickwire Spencer Steel Co.
Williamsport Wire Rope Co.

Wire Rope Slings
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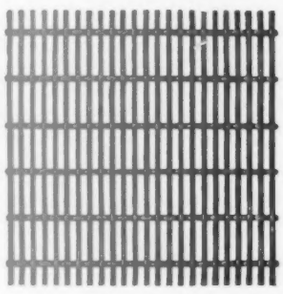
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.
*Wickwire Spencer Steel Co.
Williamsport Wire Rope Co.

Wire (Welding)
American Manganese Steel Co.
*American Steel & Wire Co.

Worm Gears (See Gears and Pinions)

*See also information in the 1937 Pit and Quarry HANDBOOK.



Rolled Slot

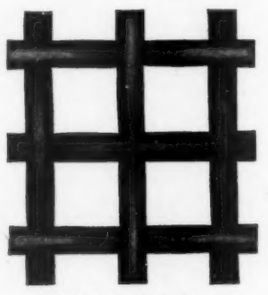
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

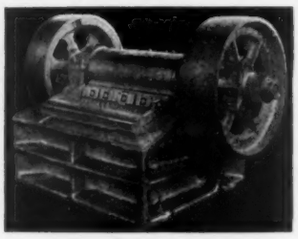
Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO

"CEDAR RAPIDS" ROLLER BEARING CRUSHER
Saves 90% On Lubrication Costs



Positive new seal keeps dirt out and grease in. Relubrication required only **once** in six months. SKF spherical self-aligning roller bearings reduce maintenance costs. Increases bearing life and eliminates failures due to overload. Main castings are electric cast annealed steel. Dependable. Durable. Economical. Many sizes. Write for bulletin.

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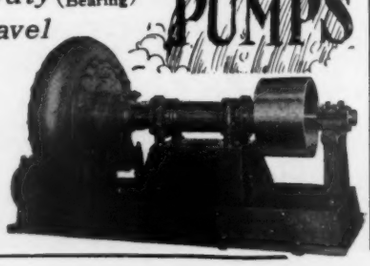
Cedar Rapids, Iowa

Lewistown Foundry Products
ARE
Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
Lewistown, Pa.

LIGHTNING PUMPS
Heavy-Duty (Ball-Bearing) Sand and Gravel



High efficiency — low operating cost—precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE

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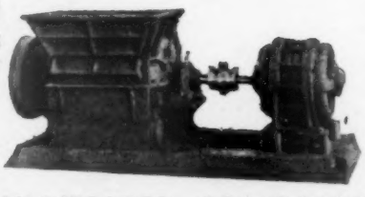
AMERICAN CRUSHERS
for Greater Tonnage at Lower Cost

Hammermill and Ring Mills built in many sizes for numerous requirements.
Tell us your reduction problems.



AMERICAN PULVERIZER COMPANY
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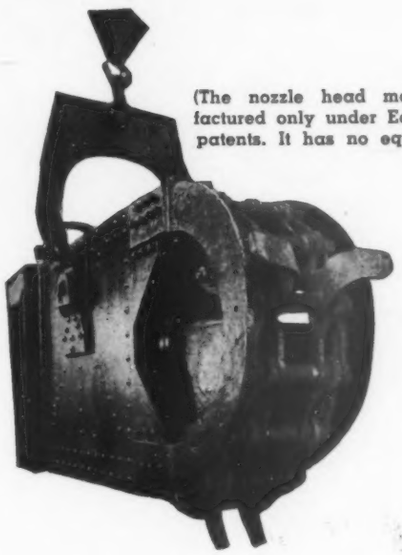


(The nozzle head manufactured only under Eagle patents. It has no equal.)

IN A CLASS BY THEMSELVES FOR LOWERING PRODUCTION COSTS . . EAGLE

"SWINTEK" SCREEN NOZZLE LADDER

They pump more solid material—lower cost of material produced—and show surprising increase in production over plain suction with operating costs often reduced by more than 50%.

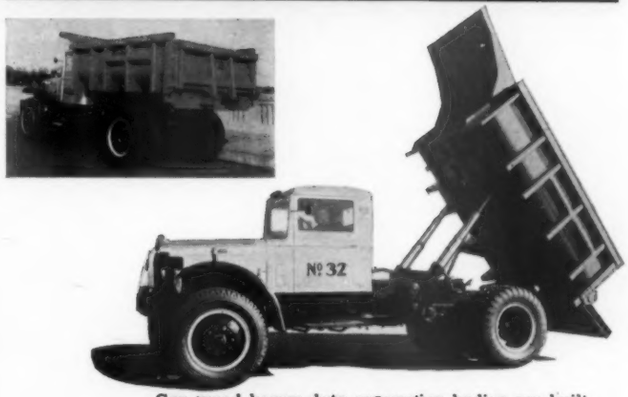
The cutters loosen deposit, insure uniform feed of solids, eliminate pumping delays, at the same time carrying oversize up the ladder as the endless chain passes over the nozzle acting as a screen.

Send for descriptive bulletin covering the many outstanding advantages of the Eagle "Swintek". Also ask for particulars for the cleaning of Sand and Gravel.

EAGLE IRON WORKS
DES MOINES, IOWA

GAR WOOD

Heavy Duty Dump Bodies
for *Rock* and *Aggregates*
and TELESCOPIC HOISTS with
PATENTED OUTSIDE MOUNTINGS

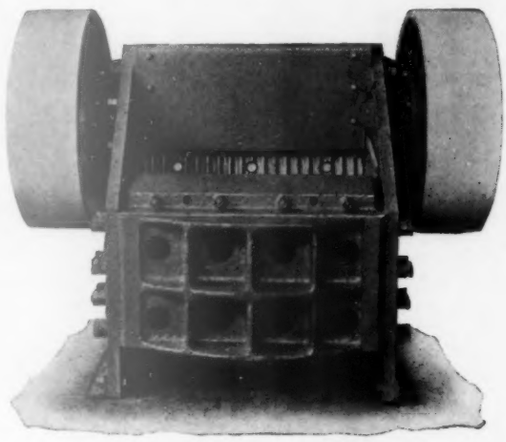


Gar wood heavy duty excavation bodies are built with downfolding tailgates as shown above, or with scoop end. Hoist is Model T33.

20 cu. yd. side dump body, and Model T44 telescopic hoist. The body weighs approximately 14,000 pounds.

Heavy duty excavation body with scoop end. Note the high dumping angle, with Model T33 dual telescopic hoist.

GAR WOOD INDUSTRIES, INC.
7924 Riopelle St. • Detroit, Mich.
WORLD'S LARGEST MANUFACTURER OF TRUCK EQUIPMENT—Hoists, Bodies, Tanks, Winches, Cranes, Trailbuilders, Bulldozers, Rippers and Hydraulic Scrapers



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A GOOD ROADS primary-reduction crusher can replace two ordinary crushers.

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GOOD ROADS MACHINERY CORP.

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for WELDING of Large Pieces

THE answer to your Heavy Welding Problems. Put them up to us. Benefit by our experience in welding parts for the highest-powered Kaplan turbines ever built.

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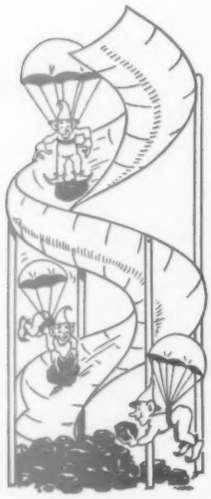

ROUND AND ROUND IT GOES
NO DEGRADATION
NO BREAKAGE

Handle your sized material with Holmes Lowering Spirals. The gentle sliding descent of materials prevents breakage or degradation—saves you money and eliminates wastage. Operated by gravity these lowering spirals have no power cost.

Tailored to your particular requirements, Holmes Lowering Spirals will give the utmost in efficiency and economy. Let our engineers consult with you.

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INCORPORATED
DANVILLE ILLINOIS

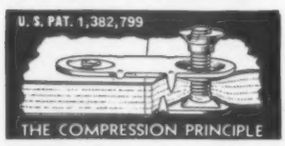
Modest or Pretentious—

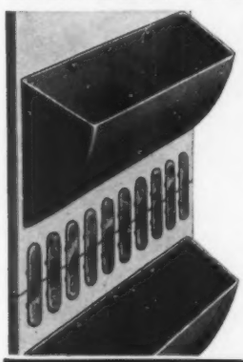
WHETHER it be a single room (as above) or an elaborate suite, you will find Hollenden guest rooms modern and up-to-the-minute in decorations, equipment and furnishings. We are completing a modernizing program which make Hollenden guest rooms as fine as any to be found in Cleveland. The location is ideal, the service excellent, the food of the best and the prices moderate. Select the Hollenden on your next trip to Cleveland

HOTEL HOLLENDEN
A DeWitt Operated Hotel CLEVELAND *R. F. Marsh, Mgr.*

•A Tight Butt Joint•

for long life of Conveyor and Elevator Belts





Note how recessed plates compress belt end. Internal friction and ply separation in belt ends is overcome. The tight butt of the belt ends prevents passage of materials or liquids through the belt. Made in steel, "Monel Metal," non-magnetic and abrasion resisting alloys. Five sizes. Sold by jobbers and belting houses. Consultation regarding belt joining invited.

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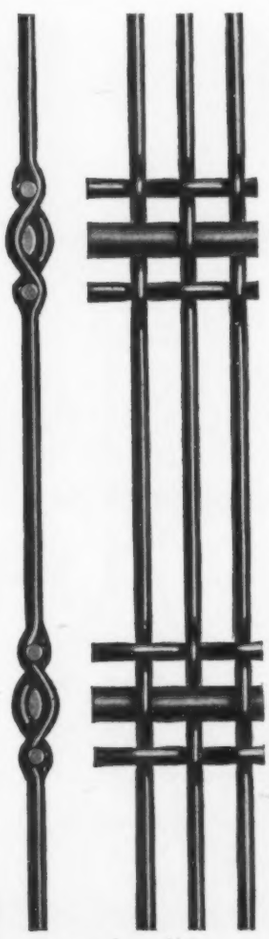

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Long-Mesh Woven Wire Screens

made to work under tension and vibration.

The straight stay - bars carry ALL the tension. The crimps in the round wires can not be stretched or broken. The screen can not be caused to sag or split by the pull of the tensioning device.

LUDLOW-SAYLOR
WIRE CO. ST. LOUIS

with this NEW BUFFALO PLAN

YOU NEED NO LONGER PUT OFF HAVING

NEW BUFFALO SCALES IMMEDIATELY *with* LOW CASH OUTLAY

To help you safeguard your profits by selling by weight instead of bulk, as well as having the long-time accuracy of modern, new Buffalo Scales under the severe punishment of heavy truck deliveries, the Buffalo Scale Company offers a convenient plan that helps you have new scales immediately with low cash outlay.

This Buffalo Scale Plan gives you the same logical convenience as can be enjoyed in the purchase of motor trucks and other heavy equipment.

Write for Bulletin showing features of Series 3200 Buffalo Truck Scales and full information on how you can install them immediately with low cash outlay.

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1200 Niagara Street BUFFALO, N. Y., U. S. A.

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Exclusive Single Link Construction, one piece pivots with maximum bearing edge for distributing the load,—these are just a few Buffalo Scale features developed during 76 years of experience.

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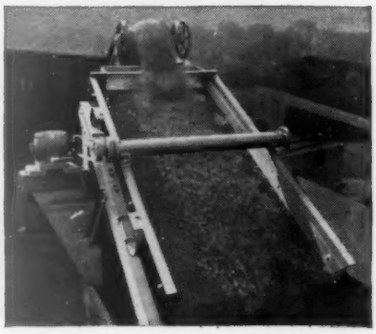
For Accurate Screening and Sizing



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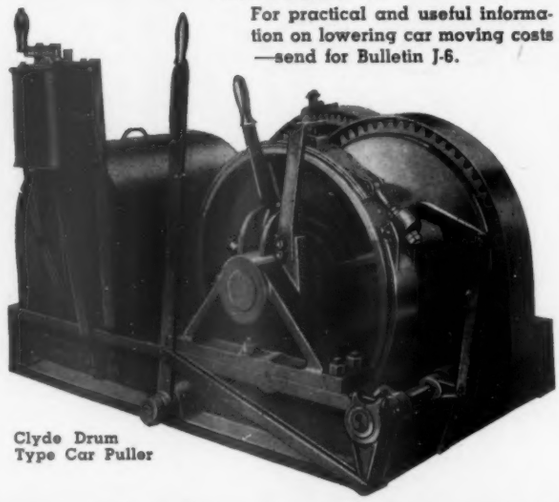
PULLS MORE . . . . . COSTS LESS

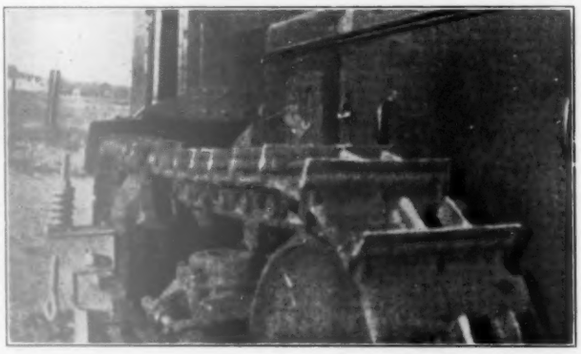
The Clyde Car Puller . . . a sturdy and powerful unit for moving cars, barges or for various kinds of haulage work. Invaluable for use at manufacturing plants, stone quarries, sand and gravel plants or for pulling heavy loads up grades. Made in sizes of 10, 15 and 20 H.P. in the drum type as illustrated, and in sizes of 5, 7½, 10, 15 and 20 H.P. in the capstan type.

For practical and useful information on lowering car moving costs —send for Bulletin J-6.



Clyde Drum Type Car Puller

CLYDE IRON WORKS, Inc.
Duluth, Minn.



TREADS restored with MANGANAL

Nickel Manganese Steel Reg. U. S. Patent Office Nos. 1,876,738, 1,947,167 and 2,021,945

Costly replacements were avoided by using special beveled sections of Manganal Applicator Bars, attached with two beads of welding electrodes, for building up worn tractor tread grousers. S-S welding products are recognized as the standard repair materials of all types of industrial equipment—Manganal for rebuilding metal and Seaco for overlay welding of 11% to 13½% nickel manganese steel. Write for Bulletins.

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Here are three brand new P&H Pacemakers, stronger, faster, easier to operate—to cut your dirt-moving costs.

P&H Model 855—2 Yd.
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Write for bulletin on the size you need. Address the Harnischfeger Corporation
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EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

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SQUARE
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HEXAGON
PERFORATED PLATE
of every description
for maximum productiveness from your vibrating screens.
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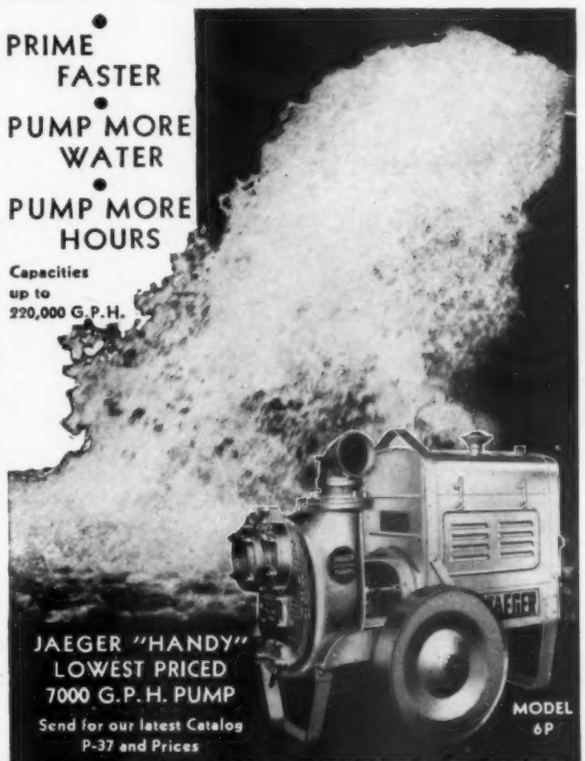
MULTICLONE

PRIME FASTER
PUMP MORE WATER
PUMP MORE HOURS

Capacities up to 220,000 G.P.H.



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MODEL 6P

JAEGER "SURE PRIME" PUMPS

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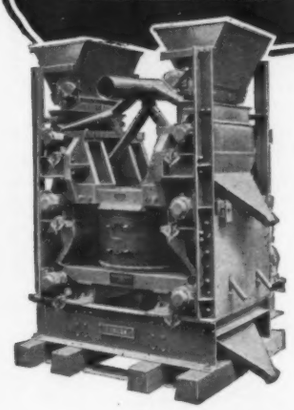

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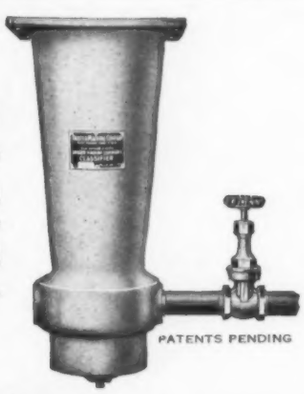
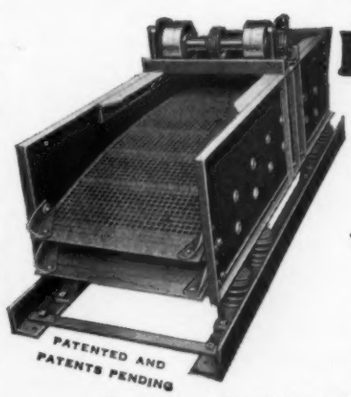
Descriptive Bulletin No. 23





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MORE POWERFUL because of exclusive power-arm combination of lever and block-and-tackle.

FASTER ACTING because of shorter cable overhaul.

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WRAPPED CARLOADS!

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Any granular or pulverized load is completely protected from contamination, rain damage, loss by seepage or sifting.

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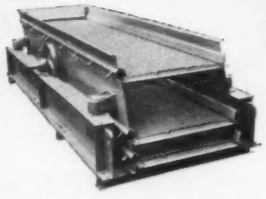
H-F (One Man) CAR LINER

TYLER SCREENS

CIRCLE-THROW MECHANICALLY AND ELECTRICALLY-VIBRATED

TON-CAP



and Woven Wire Screen
In all Meshes and Metals

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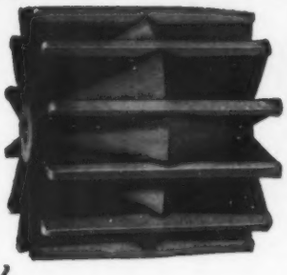

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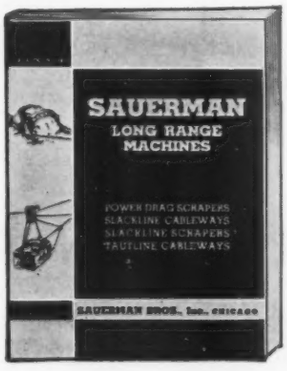

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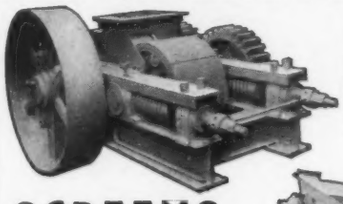

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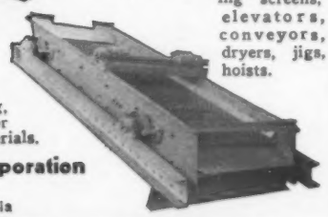

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1—Bucket elevator complete 32' centers.
1—McCormick Deer. Diesel 40 tract. with bulldozer.
1—Conveyor belt NEW 30", seven ply, 2000 ft.
1—Conveyor belt 20", five ply, 200 ft.
50—Rock drills, DCR-23, X59, X49, S70, others.
10—Concrete breakers.
30—"BARRE" pneumatic carving tools.
1—Air compressor, gas, 528' Ing. Rand, electric.
1—Sand pump, Gould 8", belt drive.
1—Barnes, centrifugal pump 8' gas driven.
1—Lawrence cent. 8" gas driven pump.
2—Derricks, steel, guy, 20 tons cap., 85' booms.
2—Derricks, stl., stiff legs, 15 ts. cap., 100' bms.
4—Derricks, steel guy, 7½ tons cap., 75' booms.
1—Steam hoist, 8¼x10" double drum, code boiler.
2—Steam hoists, 7x10" double drums, code boilers.
30—Steel blocks, sizes up to 30 tons cap.

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AIR COMPRESSORS
110, 220 & 310 Ft. I.R. Portables.
4—220 ft. I.R. Portable Diesels.
2—355 ft. I.R. 12x10 Class ER1, Bltd.
2—540 ft. I.R. 14x12 Class ER1, Bltd.
676 ft. I.R. XCB 15x9¼x12, Belted.
2—676 ft. Chgo. Pneu. Benz Diesels.

CRANES & SHOVELS
15 ton Northwest Class M, 50 ft. Boom.
18 ton P&H Class 700 Crane.
1½ yd. Thew Diesel Shovel.
¾ yd. and 1¼ yd. Marion Elec. Shovels.
1½ yd. Marion 37 Steamer.
2 Erie B2 1 yd. Steam Shovels.
25 ton Browning Locomotive Crane.

HOISTING ENGINES
40 HP Lambert Double Drum, Electric.
75 HP Sauerman Gas Scraper.
60-80 HP Lambert Elec. D.D. & Swinger.
7x10, 8x12x10x12 Steam Hoists.

LOCOMOTIVES
40 ton Baldwin Std. Ga. Saddle Tank.
10 ton Milwaukee Gas, Std. Ga.
6—12 & 14 ton Vulcan, 36 in. ga. Gas.
3—5 & 6 ton Plymouth, 36 in. ga. Gas.

ELECTRIC LOCOMOTIVES
3—6 Ton G. E. 30 in. ga. Trolley.
6—3 to 6 Ton Mancha 24 ga. S. Battery.
4—5 to 8 Ton Whitcomb 36 ga. S. Battery.

CONVEYOR EQUIPMENT
500 ft. 24 in., 5 ply Belt.
750 ft. 18 in., 4 ply Belt.
18 in., 24 in., 30 in., 36 in. Idlers.
50 ft. Portable 22 in. conveyor.

DUMP CARS
7 Koppel, 3 yd. V, 36 in. ga.
28 Koppel, 1¾ yd. V, 36 in. ga.
46 Koppel, 1 & 1½ yd. V, 24 in. ga.

STEEL DERRICKS
2 American 15 ton, 100 ft. Stiff Leg.
3 Terry, 90 ft. Boom, Guy Type.

PORTABLE TRACK
10 Miles 20 lb., 24 in. gauge.
3000 ft. 30 lb., 36 in. ga.

JAW CRUSHERS
9x16 Champion Steel Plate Frame.
8x16 Western and Elevator on Wheels.
5x10 and 9x16 Sturtevant.
15x24 Universal.
10x20 Champion.
12x16 Traylor, late type.
15x30 Traylor, new 1936.
11x12 New England.
36x10 Farrell, type B.
18x36 and 24x36 Farrell B.
14x36 and 16x10 Acme Steel Frame.
24x36 Worthington Superior.
48x72 Buchanan type C.

GYRATORY & CONE CRUSHERS
No. 2 Symons Coarse Cone Crusher.
7 Inch Newhouse & 60 HP Motor.
18-24-36-48 Symons Disc Type.
Gates No. 3 with TZ Head.
No. 3 Austin, 8½x24 opening.
No. 5 Telsmith.
36 Inch Superior McCully.
8 In. and 10 In. Superior McCully.
No. 6 Traylor, 12 Inch Opening.
No. 37 and 49 Kennedy.
2 Austin No. 5.
15 Gates K Nos. 4, 5, 6, 7½ & 8.

ROLLS & PULVERIZERS
24x26 Link Belt coal crusher.
Jeffrey No. 3 Crusher—Pulverizer.
42 Inch Fuller Lehigh Pulverizers.
No. 3 Williams Helix Seal Impact Mill.
Raymond No. 0 Pulverizer.
American No. 36 Hammermill.
36x16 Kennedy Double Rolls.
36x16 Worthington Single Rolls.
34x20 Jeffrey Double Rolls.
36x16 Traylor Rolls.

SCREENS
4' x 12' Tyler—Niagara Type 300, 2 Deck.
6 Hummer 4x5, 1 & 2 Deck.
4x8 Allis Chalmers, 2 Deck.
3x5 Hummer 33, 2 Deck.
70x102 Traylor FB4, 2 Deck.
2 Rotex 20x87, 3 Deck.
2 Universal, 3x8, Single Deck.

SAND PLANT
Tyler—Niagara 20" x 4" Gyrating Scrubber.
1 Pioneer Model 300W Portable.

COMPLETE PLANTS BOUGHT & SOLD

R. C. Stanhope, Inc.
875 Sixth Ave. New York, N. Y.

FOR SALE

Complete quarry equipment, consisting of two crushers, screens, elevators, bins, electric motors, pumps, gas air shovel and air compressors.

Full details on request.

TILLY FOSTER ROAD MATERIAL CO.
D. M. Stephens, Receiver Brewster, N. Y.

STOP!

CONSULT R. S. C. LISTINGS

BUCKETS—CLAMSHELL:
1—1¼ yd. Rehandling fast operating type (also ½ and ¾ yd.)
1—1 yd. Blaw Knox Dreadn't. No. 611 Rehdlg. typ.

COMPRESSORS—PORTABLE:
3—110 cu. ft., 3—220 cu. ft., 1—310 cu. ft.

COMPRESSORS—STATIONARY:
2—CP 664 cu. ft., 15—9x10 type VC—Diesel Eng.

CRANES & SHOVELS:
1—1¼ yd. Browning full revlv. gas crawler crane.
1—½ yd. Austin simplex full revolve gas crawler shovel, 40' crane boom.
1—Lidgerwood Otis type "A" Tract. Crn. mtd. on McCor.-Deer'g. "202" Tract., solid R.T. whls.

MIXER—TRUCK:
1—2 yd. Jaeger, rear discharge.

PUMPS:
3—2 x 2 LaBour self prime electric motors.
3—6 x 6 Marlo self prime

ROLLERS:
1—10 ton Austin 3 whl. gas roller, Autocrat mod.
1—4 to 5 ton Austin "Pup" 4 cyl. Case pwr. unit.
1—10 ton Huber 3 wheel gas roller.
1— 5 ton Huber 3 wheel gas roller.

TRACTORS:
1—TD40 Diesel International Trac Tractor with hydraulic bulldozer and trail builder.
1—Caterpillar "60" with crawler tracks & bulldoz.
2—Ford. nar. ga. Ind. tracts., sol. R.T. disc whls.

RENTAL SERVICE CO., INC.
2015 W. Venango St. Philadelphia, Pa.

CONSOLIDATED
GOOD USED EQUIPMENT

We have just purchased a complete plant at Boston and will sell as a whole or separately the following:

1—24x36" Bacon-Farrel Jaw Crusher.
1—4' Symons Cone Crusher. New 1932.
1—100 H.P. 3/60/440 Slipring Motor; also 25 H.P. and 50 H.P.
2—3x6' Niagara 2-deck Screens.
1—24" Bucket Elevator, 75' centers.
1—500 CFM I-R Air Compressor.
1—20-ton Truck Scale.

Another small complete plant for sale as a whole or separately.

1—9x15 Austin Western Crusher.
1—35' Steel Bucket Elevator.
4—3'x6' Sturtevant M V Screens.
1—No. 1 Sturtevant Ring Roll Mill.
1—42"x25' Calciner, with gear reducer, motors, pyrometer, etc.
1—2x8' type No. 100 Tyler Niagara Scrn., 2-deck.
1—Dings Magnetic Separator, late style, type "B", No. 0.
1—Tyler Rotex Screen, with 23 sieves.
3—Log Washers, 14"x18'.
All motor driven—also miscellaneous equipment.

3—4'x8' Allis-Chalmers Screens, 2-deck.
1—3'x6' Niagara Screen, 2-deck.
3—4'x5' Tyler Screens, No. 31, 2- and 3-deck.
1—24x24" Link Belt Single Roll Crusher.
1—5-roll Raymond High Side Mill.
7—Hardinge Iron Lined Ball Mills; 3'x8", 4½'x16", 6'x16", 6'x22", 8'x22", 8'x30".
2—6'x22' Iron Lined Tube Mills.
1—3'x12' Hendy Iron Lined Tube Mill.
5—Ruggles-Coles, Class A, Direct Heat Rotary Dryers; 5'x26', 5'x30', 80"x40', 70"x45'.
11—Rotary Kilns; 42"x25', 6'x60', 7'x100', 8'x110', 8'x125', 9'6"x150'.

Just a partial list.

We Will Buy a Single Machine or Complete Plant.

What do you wish to sell? Send us details.

CONSOLIDATED PRODUCTS COMPANY, INC.
17-19 Park Row - - - - New York, N. Y.
Plant and Shops at Newark, N. J., cover 8 acres of ground.

TUNNEL EQUIPMENT — New 1936

3—50 HP Elec. Shaft Hoists.
1—Connersville Blower 13 cu. ft. per rev.
3—No. 5½ Buffalo Blowers.
12—N-75 Ing-Rand Drifter Drills.
3—Ing-Rand Sinking Pumps.
3—Cameron Pumps.
12—40 cu. ft. Koppel cars.
2—Mancha Battery Locomotives.
4—Round Shaft Buckets.
6—Sullivan D. D. Turbinair Hoists.
50—Column Clamps.

MISCELLANEOUS

Pile hammers Nos. 3, 6, 7, 9B-2.
Pulling Attachments for 6 & 7.
¾ yd. Osgood Comb. Crane Shovel.
Compressors:
Ing. Rand 446, 310.
Sullivan 110.
Chrysler 136.
Ing.-Rand Jackhammers and Busters.
¾ yd. Hayward Clamshell.
10-S Concrete Mixer.
27-E Ransome Paver.
5 ton Bflo-Spring. 3 wheel roller.
Lakewood finisher.
Insley Shoulder Machine.
2—5 yd. Athey Crawler Wagons.
Triplex Road Pump 80 gal.
Pumps 2, 3, 4 inch Gas and Elec.
Booms for Marione & Osgood 1¼ yd. steam cranes.
7x10 SD Hoist.
2—Swinging Engines.
70 Pcs. Steel Sheet Piling 22 ft.

J. T. WALSH
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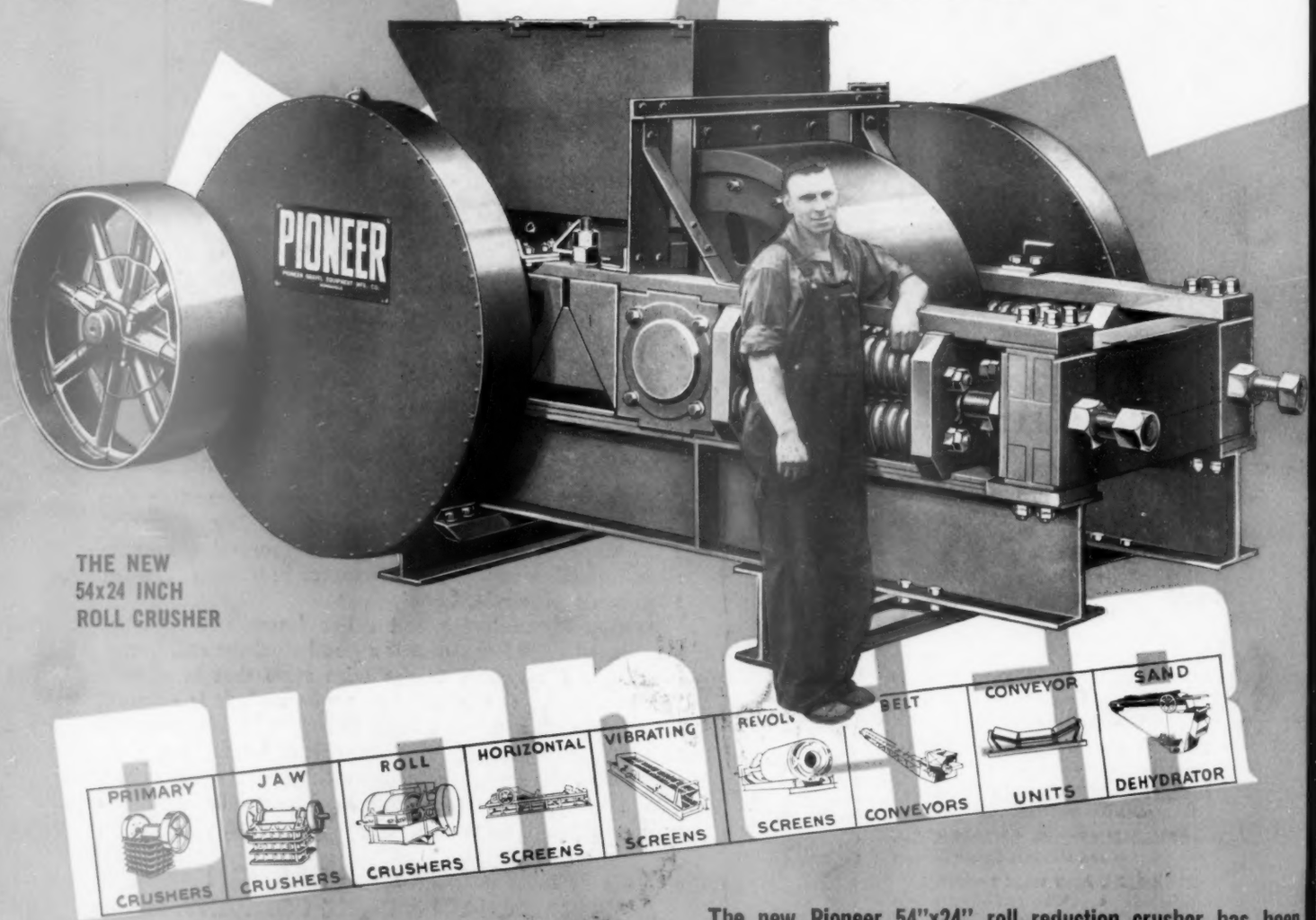
Portable producers have always looked to Pioneer for leadership. Pioneer was the first to design and produce the portable one-unit crushing plant, the duplex plant, the anti-friction bearing roll crusher, the horizontal screen, the portable washing plant and the portable stabilizer plant.

And now Pioneer is a leader in the design of new products for the commercial producer. Pioneer was the first to announce a 24"x36" primary jaw crusher with steel base, overhead eccentric and SKF bearings. Pioneer was the first to perfect the counter-balanced horizontal gradation screen.



Today Pioneer announces its latest contribution for the commercial producer — the new 54-24 roll crusher.

The roll crusher has proven itself one of the greatest secondary rock producers. It has greater capacity, requires less power per ton and will produce smaller rock than any other type or crusher of similar cost and weight.

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